MARYLAND HISTORICAL TRUST
DETERMINATION OF ELIGIBILITY FORM

NR Eligible: yes ___
no ___

Property Name: Building 2 (Goddard Space Flight Center) Inventory Number: PG:67-39

Address: 8800 Greenbelt Road City: Greenbelt Zip Code: 20771

County: Prince George's USGS Topographic Map: Lanham

Owner: National Aeronautics and Space Administration Is the property being evaluated a district? ___ yes

Tax Parcel Number: N/A Tax Map Number: N/A Tax Account ID Number: N/A

Project: ___ Agency: ___

Site visit by MHT Staff: ___ no ___ yes Name: ___ Date: ___

Is the property located within a historic district? ___ yes ___ no

If the property is within a district District Inventory Number: ___

NR-listed district ___ yes Eligible district ___ yes District Name: ___

Preparer's Recommendation: Contributing resource ___ yes ___ no Non-contributing but eligible in another context ___

If the property is not within a district (or the property is a district)

Preparer's Recommendation: Eligible ___ yes ___ no

Criteria: ___ A ___ B ___ C ___ D Considerations: ___ A ___ B ___ C ___ D ___ E ___ F ___ G ___ None

Documentation on the property/district is presented in: Determination of Eligibility Form for Building 2 (PG: 67-39). Prepared by R. Goodwin & Associates, 2009.

Description of Property and Eligibility Determination: *(Use continuation sheet if necessary and attach map and photo)*

Summary Description

Building 2 is part of the 1,270-acre campus of the Goddard Space Flight Center (GSFC) in Greenbelt, Prince George's County, Maryland. The building is situated on the north side of Aerobee Road near the southwest corner of the GSFC campus. Completed in September 1960 and based on an International-style design by the New York City-based architectural firm of Voorhees, Walker, Smith, and Smith, Building 2 was the second building completed within the GSFC. Building 2, constructed as the Research Development Laboratory/Space Sciences Center, housed the Space Sciences Division for the National Aeronautics and Space Administration (NASA). The GSFC was created by NASA in 1959 to design and test unmanned objects launched into space, a mission that continues to the present day. Building 2, vacant since 2010, is one of over 50 buildings that presently occupy the campus. The buildings of the GSFC campus, including Building 2, are connected through a series of vehicular and pedestrian circulation paths. A large asphalt-paved parking lot is located on the north side of the Building 2, with a smaller lot located to the east. A concrete sidewalk separates the south side of the building from Aerobee Road. A wooded lot is located farther to the south, while Building 1 (1960) is situated to the east, and Building 6 (1962) is located to the west. Building 2 is surrounded by minimal landscaping and is currently enclosed by a metal movable security fence. (cont.)

Prepared by: B. Frederick/E. Young-Diehl Date Prepared: March 18, 2011

MARYLAND HISTORICAL TRUST REVIEW

Eligibility recommended X **Eligibility not recommended** ___

Criteria: X **A** ___ **B** X **C** ___ **D** **Considerations:** ___ **A** ___ **B** ___ **C** ___ **D** ___ **E** ___ **F** ___ **G** ___ **None**

Comments: ___

Jonathan Sager 4/22/11

Reviewer, Office of Preservation Services **Date**

[illegible] 4/20/11

Reviewer, NR Program **Date**

201101305

Exterior Description
(The following exterior description is summarized from Kirsten Peeler, *Building 2, PG:67-39, Determination of Eligibility Form*, 2009, with additional details added for clarification. For more detail on the building's exterior appearance, please see the referenced 2009 form.)

Building 2 measures three stories (ground, first and second) in height with a metal-clad penthouse on the roof. The building is banked into a hill that slopes downward from west to east so that the west elevation appears to measure two stories in height. The original 1960 block consists of a rectangular footprint that stretches from east to west, with an original ell extending from the south elevation. The building includes three large additions constructed in 1967, 1986, and 1993, on the south and west elevations.

The building rests on a poured-concrete foundation and is capped by a gravel and tar-clad roof. The exterior walls of the original block are clad in brick at the east and west elevations as well as below the first-story window openings, above the third-story window openings, and at the ends of the north and south elevations. Vertical metal panels surround each window in the north and south elevation, while textured masonry that appears to be an exterior insulation finishing system is located above each window opening. The windows are primarily fixed-sash, anodized-aluminum types that were installed in 1995. The exterior metal panels and exterior insulation finishing were also installed at that time.

The main entrance into the building is located in the southernmost bay of the east elevation of the original 1960 block. The recessed entrance is located in a glass-enclosed vestibule, divided by square metal posts that support a cantilevered overhang. The building retains the original double-leaf, metal entry doors with flanking, single-light, metal windows. A row of fixed-light, aluminum-sash windows topped by transoms, grouped in sets of four by dividing metal posts, extend north from the entry and continue to the end of the elevation. A metal "2" hangs from the east elevation, just above the ground-story window wall. The rest of the elevation is devoid of openings.

The south elevation of the original block consists of 17 bays before it is interrupted by the 1967 west ell addition. The original block then continues for an additional seven bays beyond the addition. A four-story, four-bay original ell extends southward near the eastern end of the building, approximately two bays in [west] from the building's end. The fourth story is recessed on the ell's east elevation. The ell contains the same finishes and windows as the original block. A large metal vent located in the fourth story extends the length of the four window bays below. A metal "2" is also attached to the south elevation near the main entrance.

The 1967 west ell addition measures three stories tall and five bays wide. The addition contains the same exterior wall cladding and windows as the original block. An entry, consisting of a single-leaf, metal and glass door is located in the north end of the ell's west elevation. A single-story rooftop metal addition, most likely added in 1967, is located where the original block joins the west ell addition. The flat-roof addition has walls clad in metal with louvered openings.

A two-story brick and metal addition was constructed in 1993 on the south elevation of the 1967 west ell to accommodate a high bay (a place for conducting and assembling large experiments and equipment). The high bay occupies the southwest corner of the addition. A large overhead metal door occupies the westernmost bay in the south elevation and denotes the 1995 loading dock addition to the high bay. The loading dock addition is offset from the south elevation. The loading dock addition is capped by a flat roof, with the high bay addition capped by a shallow gable roof. Raised metal panels clad the exterior of the high bay addition and continue around to the west elevation. The openings in the high bay section are characterized by a translucent wall system comprised of three bays, each containing four large multi-light openings covered in an opaque material, in both the north and south elevation. The east and west elevations each contain a single-leaf metal pedestrian door accessed by a metal staircase.

A 1986 brick addition conceals the west elevation of the original block. The addition includes a loading dock that was constructed on the south elevation of the original block and features a large metal overhead garage door and concrete loading platform. The west elevation features a recessed entrance located in a two-story glass and metal curtain wall. The west and south elevations each feature fixed-sash, multi-light window bays divided by simple brick pilasters. The north elevation of the addition features continuous bands of anodized-aluminum, fixed-sash windows in each story.

The north elevation of the original block measures 36 bays wide until it is interrupted by the 1986 addition on the west end. The exterior wall cladding and details are the same as those found on the south elevation of the original block. The elevation's primary entrance is located off-center and features a set of double-leaf metal doors. An additional entrance is located near the west end of the elevation and features a single-leaf metal door flanked by a small metal window. A loading dock is situated near the east end of the elevation and consists of a large metal overhead door, accessed at the exterior by metal steps and a concrete landing. A brick wall with decorative openings protrudes from the north elevation east of the loading dock and is meant to serve as a screen to those viewing the loading dock from the east.

Interior Description

(The following is based on interior investigations of Building 2 carried out in March 2011. Please note throughout this form, the interior is described as ground floor, first floor, and second floor, as specified in the original building plans and the room numbering system).

The interior of Building 2, as originally intended and designed, has been continuously altered and updated in order to adapt to the changing technologies and advancements of the types of experiments and research carried out by the scientists, engineers, and technicians located inside the building from the time of its original occupancy in 1960 until it was vacated in 2010. Most of the original equipment, except where noted, has been removed; however, many of the original building materials, particularly in the laboratories of the original 1960 block, remain. Furthermore, the building retains many of the features that made it a usable space, such as the movable partitions between the laboratories, large window openings, and capabilities within the laboratory space for compressed air, gas, electric, water, and drainage.

The original block of Building 2 retains its overall interior spatial division. Primary access into the building is through the east elevation entry vestibule, with secondary entries located in the north elevation of the original block and west elevation of the 1986 addition. The primary entry vestibule contains rubber flooring that conceals the original terrazzo flooring underneath (GSFC var.). The walls of the vestibule are glass and exposed brick, and the ceiling is plaster. Glass and aluminum directory boards, most likely original, hang on the west wall of the vestibule.

A set of double-leaf aluminum and glass doors provide access from the vestibule into the building. The original block is set up essentially the same way on each floor, with a long central corridor that divides laboratory space to the north and offices to the south. Large multi-room suites are located in the four-story ell at the southeast end of each floor, and historically served administrative purposes. These suites largely contain replacement materials, including glass and aluminum doors, industrial carpeting, and dropped acoustic-tile ceilings with inset fluorescent lighting. Each floor also contains restrooms, janitor's closets, and electrical equipment rooms, all original to the design of the building, although the materials and finishes in the restrooms have been updated as well as the electrical equipment. Elevators and stair wells provide access to the various levels. The 1960 stairwell retains terrazzo treads and landings, tile walls, and a wooden handrail.

The majority of the interior doors of the original block remain. The laboratories are accessed by double-leaf metal doors comprised of a full-size pedestrian door paired with a narrower single-leaf door in order to accommodate larger equipment in and out of the room. The office doors consist of single-leaf pedestrian types. The doors are made of steel and feature a single frosted light with vents beneath. In addition, many of the original building materials remain, particularly in the laboratory spaces. These largely consist of nine-inch asbestos floor tiles, metal or rubber baseboards, and concrete ceilings with suspended metal lighting. Some laboratories feature panels of acoustic tiles on the ceiling. Where lab spaces have been converted to use as clean rooms, the ceilings feature dropped acoustic-tile with inset fluorescent lighting. The interior walls of the laboratories are composite board panels, which could be moved in order to accommodate larger or smaller laboratory space as needed. Several laboratories throughout each floor retain the original metal washing sink, mounted metal cable races on the ceiling for carrying computer instrumentation prior to the use of fiber optic cables, wall filters/vacuums for clean rooms, and ceiling-mounted ¼-ton cranes (Room 046). Some of the laboratories also feature the original interior metal and wood wall shelving, coat niches with metal hooks, and large hooks attached to the ceiling used to accommodate pulley systems for lifting heavy equipment (Room 054). Some of the original blackboards also remain in both the laboratories and office spaces.

Interior alterations include the application 12-inch vinyl tile throughout the corridors as well as in some of the laboratory spaces, industrial carpeting in many of the office spaces and first-floor conference room (enlarged in 1992), as well as dropped acoustic-tile ceilings with inset fluorescent lighting in the offices, corridor, and in some of the laboratories. In addition, the former accelerator room on the ground floor and the computer wing on the second floor of the 1986 addition have been fitted with raised wood panel flooring in order to accommodate computer cables and equipment beneath.

Notable interior spaces of the ground floor include the accelerator room which was added to the west end of the ground floor in the mid to late 1960s (Room 075, 075A, 075B). Although the accelerator was removed from the building in 1985, the room retains its original walls that measure approximately 12-inches thick. Notably, the subsequent additions to the southwest end of the building can only be accessed via the first and second floors as the impenetrable walls of the accelerator room prohibited direct access from the ground floor. The massive concrete door of the accelerator room also remains (Room 071). Other noteworthy spaces on the ground floor include Room 051, which served as a clean room, library/resource room, and the room where technicians constructed SAS-2/SAS-B. While the space remains, the room has been altered through the application of industrial carpeting, plaster walls, and a dropped acoustic-tile ceiling (Daniels 2011). Rooms 067A and 067B served as dark rooms where technicians used emulsions for gamma ray detection (Daniels 2011). Consequently, these two rooms feature smooth vinyl-tiled floors, composite board walls, smooth plaster ceilings, and no window openings. The high bay, constructed in 1993 at the south end of the 1967 addition, includes a poured-concrete floor, metal walls, lab spaces at the loft, and the large overhead cranes.

Notable interior spaces of the first floor include the chemical wing, which is located in the 1986 addition. This space consists of poured-concrete floors, thick walls, and smooth plaster ceilings. The fenestration of this wing was designed so that if there was an explosion, the windows would collapse outward to relieve the pressure (Daniels 2011). The second floor contains two clean rooms (Room 264/264A), which retain the filters/cleaning vents in the north and south walls as well as the clean hood in which experiments were performed. The floors, walls, and ceilings of these spaces are seamless to deter dirt and dust particles from entering. The 1986 west wing of the second floor largely housed computer equipment and data processing for the building, as evidenced by the raised floor.

The penthouse, which accommodated the soft x-ray accelerator built by the High-Energy Astrophysics division and storage spaces, is largely intact. At the south end of the roof, the test chambers on the east side and the target chamber on the west side remain as well as the metal brackets that were used to hold the 12-inch diameter vacuum tube which connected the two chambers. The accelerator was removed in 1985. The floors are comprised of poured-concrete, with vinyl tile located in the two chambers that housed the accelerator equipment. The walls and ceiling consist of exposed metal sheeting. Large metal cages used for storage are still present in the north end of the penthouse and mechanical equipment is also present.

<u>Integrity</u>
Building 2 retains its original location and setting near the southwest corner of the GSFC campus, adjacent to Aerobee Road. The building has undergone alterations to the exterior, including the construction of additions and application of replacement wall cladding, so that integrity of design, workmanship, and materials has largely been compromised on the exterior; however, integrity of design is retained on the interior through the retention of the laboratory/office spatial division of the original block. The retention of the interior layout, asbestos tile floors, movable wall partitions, wide window openings, and starkness of the laboratory spaces culminate in sufficient integrity of materials, design, association and feeling to convey Building 2's former use as a research and science building.

<u>Brief History of the National Aeronautics and Space Administration (NASA)</u>
(The following is taken from Steven J. Dick, "50 Years of NASA History," 2007, except where noted.)

The birth of NASA was directly related to the political conflict and competition between the U.S. and Soviet Union in the post-World War II era. The ensuing Cold War utilized technology as one of the means of measuring successes and projecting power. On July 29, 1955, the United States announced that it would launch "small, unmanned earth-circling satellites," with the Soviets announcing that they would do the same the next day (Rosenthal 1962:11). The U.S. announcement of the proposed satellite launching was the product of coordinated efforts within the National Academy of Sciences, which would determine the experiments to be orbited; the National Science Foundation, which would supply the necessary funds; and the Department of Defense, who would launch the satellite (Rosenthal 1962:11). Several months later, on September 9, 1955, Project Vanguard was officially authorized when the Department of Defense notified the Secretary of the Navy to proceed with a project with the following goals:

- To develop and procure a satellite launching vehicle;
- To place at least one satellite into orbit during 1957-1958;
- To accomplish one scientific experiment with the satellite; and,
- To track the satellite's flight to demonstrate that it had actually obtained orbit. (Rosenthal 1962:11)

Despite the best efforts of Project Vanguard to swiftly send an object into orbit, the Soviets were successful in launching Sputnik, the first object to orbit the earth, on October 4, 1957. This successful launch moved the competition from ground into space, and also fueled the general realization by the federal government that the U.S. space exploration effort had to be greatly expanded and financially supported (Rosenthal 1962:15). The United States was able to respond with the launching of its first satellite, Explorer I, in January 1958, using technologies developed for German rockets during World War II by the Project Vanguard team.

Driven by the competition of the Cold War, President Dwight D. Eisenhower signed the National Aeronautics and Space Act on July 29, 1958, to provide for research into flight within the Earth's atmosphere and in space. The act also created a new civilian agency designated as the National Aeronautics and Space Administration (NASA) to oversee research and activities in space devoted to peaceful purposes (Rosenthal 1962:19). NASA absorbed the approximately 8,000 people and five laboratories of the National Advisory Council for Aeronautics (NACA). The five facilities included the Wallops Island (VA) Station and four research centers: Langley Research Center (Hampton, VA), Lewis Research Center (Cleveland, OH), Ames Research Center (Moffet Field, CA), and the Flight Research Center (Edwards Air Force Base, CA) (Rosenthal 1962:17). NASA also incorporated parts of other organizations, including the Jet Propulsion Lab (JPL) in Pasadena, California. At the same time a new Space Projects Center (future Goddard Space Flight Center) was formed from the core of the space science group at the Naval Research Laboratory (NRL). The JPL was given the task of managing planetary missions, while the new Space Projects Center was given responsibility for theoretical research to support space science research as well as all aspects of Earth-orbiting satellite development and operations (Wallace 1999:Preface).

The 1960s were a decade of significant achievements in space exploration for NASA, as well as an era of unsurpassed funding. Following President John F. Kennedy's challenge to put a man on the moon within the decade (issued on May 25, 1961), NASA's research efforts became focused on advancing human space flight. Building on the success of the Mercury and Gemini flights of the early 1960s, the successful Apollo mission was completed in July 1969: Americans were the first to land and walk on the moon. With the ending of the Apollo program and achievement of the moon walk, there was a lessening of public support for space exploration. This came at the same time the increasingly unpopular Vietnam War occupied the public's attention and placed a financial burden on the nation (Gawdiak and Fedor 1994:3-4).

NASA's annual budget, which had reached $5 billion in the mid-1960s, was reduced to just over $3 billion by 1974. The loss in funding for space programs in the 1970s resulted in the advancement of space projects that were more modest and practical from the public's point of view. NASA cutbacks also resulted in less expansion at installations, the closing of some facilities, and a reduction in work force. In spite of the cuts in its funding and personnel, NASA made important advancements in the space and earth sciences during the 1970s, and there was greater collaboration between government agencies, private corporations, and foreign governments (Gawdiak and Fedor 1994:3-4).

In addition to manned spaces efforts, NASA's focus included exploration of the space and earth sciences. The majority of NASA's approximately 65 space science missions launched between 1968 and 1979 were in the areas of physics and astronomy, with 53 payloads specific to these disciplines. The successful Explorer series comprised many of the missions. NASA also began to use observatory-class physics and astronomy spacecraft programs in the 1960s, and continued to do so into the 1970s. The Orbiting Solar Observatory (OSO), Orbiting Geophysical Observatory (OGO), Orbiting Astronomical Observatory (OAO), and High Energy Astronomy Observatories (HEAO) provided flexible platforms for scientific experiments that were put into Earth's orbit (Rumerman 1999:364-365). Planetary science expeditions of this era included trips to Venus and Mars in the 1960s and Mercury in the early 1970s. Pioneers 10 and 11 offered the first look at Jupiter and Saturn in the mid-1970s, while Jupiter, Saturn, Uranus, and Neptune were first photographed on the Voyager 1 and 2 missions of 1977.

NASA's early studies of the Earth using satellites placed in low-Earth orbit began in the 1960s and led to advances in meteorology, navigation, and worldwide communications. Television Infrared Observational Satellites, the first weather satellites, were taken over by NASA when it formed in 1958. The next generation of weather satellites, NIMBUS, was initially developed and operated by NASA. Today, NASA is working with the National Oceanic and Atmospheric Administration (NOAA) and others to develop satellites that study the earth on a more global scale.

In the 1980s, NASA began taking steps toward a more comprehensive plan for studying the entire Earth system. First launched in 1981, NASA developed the first reusable spacecraft, which could carry humans as well as satellites into space. The Space Transportation System (STS), more commonly known as the Shuttle Program, was responsible for the placement of a number of notable scientific missions into orbit, including the Hubble Telescope. The Shuttle Program also repeatedly carried people into orbit; launched, recovered, and repaired satellites; and conducted cutting-edge research. The Shuttle Program also supported assembly of the International Space Station (ISS), the largest structure in space, in low-Earth orbit. The ISS was intended to offer a long-term platform where extended studies could be conducted.

Specific to the space sciences, the number of dedicated NASA missions declined to 17 between the years 1979 and 1988, with four additional missions launched aboard the Space Shuttle. The lower number of missions in this period can be attributed partially to the Challenger accident in 1986, as many experiments to be flown on shuttle missions were delayed. Decreases in funding, advances in data collection procedures; and changes in research priorities within NASA further contributed to the reduction in space science missions (Rumerman 1999:364; Ness 2011).

Throughout the 1990s and into the present day, research focuses shifted (particularly for space sciences and planetary exploration) away from the moon toward exploration of Mars, Jupiter, and Saturn, as well as comets and asteroids. The Galileo mission that orbited Jupiter from 1995 to 2003, coupled with the arrival of the Cassini/Huygens spacecraft at Saturn in 2004, provided invaluable insight into the knowledge of gas giant planets. In addition, over the last two decades, a variety of NASA and international spacecraft have voyaged to six comets, including the famous Halley's Comet, and several asteroids. Specifically in the areas of Space Astronomy and Astrophysics, NASA built upon the observatories from the 1960s and 1970s to develop the Hubble Space Telescope (1990), the Compton Gamma Ray Observatory (1991), the Chandra X-Ray Telescope (1999), and the Spitzer Infrared Telescope (2004).

Collectively, NASA astronomy and astrophysics spacecraft have provided invaluable information on cosmic evolution from the big bang to the present day. Notably, in 2006, the Nobel Prize for physics was jointly awarded to Goddard Space Flight Center (GSFC) senior project scientist Dr. John C. Mather and to University of California (UCA)-Berkeley scientist Dr. George Smooth for their contributions to the Cosmic Background Explorer (COBE) project.

History of Goddard Space Flight Center

The GSFC has evolved from approximately 200 staff housed in borrowed offices to a sprawling 1,270-acre campus that supports the work of over 11,000 people. Since its inception in 1959, GSFC has successfully launched over 200 scientific satellites and continues to play an important role in the development of weather, communications, and Earth satellites. The flight center has covered almost every aspect of space science experiments, from developing theory; to building spacecraft instruments and launch vehicles; to operating and tracking satellites in space; and collecting, analyzing, and distributing the collected data to the international scientific community (Wallace 1999:Preface).

Following the creation of NASA in 1958, several military space research projects were transferred to the new organization, including the Navy's Vanguard project. As a result, 157 Vanguard Project personnel were transferred from the NRL to the Space Sciences Division of NASA by December 1958. Between December 1958 and January 1959, 15 people were transferred from the NRL to NASA's Theoretical Division. Subsequently, this contingent, as well as the Vanguard Project Division, were designated by NASA Headquarters to serve as the nucleus of a new Space Projects Center. Staff for the new space center were initially housed throughout the country, with NRL scientists housed in temporary quarters in two abandoned warehouses next to the Naval lab facilities. Additional administrative personnel were located at the Naval Receiving Station and at NASA's temporary headquarters on H Street in Washington, D.C. The Theoretical Division was housed above the Mazor Furniture Store in Silver Spring, Maryland (Wallace 1999:19; Rosenthal 1962:17; Meredith 2011; Looney 2011).

The arrival of the space age and the creation of NASA's first Space Projects Center made apparent the need for new infrastructure to organize and manage projects that involved thousands of people and millions of dollars. NASA's several aeronautical research centers located throughout the country could only accommodate projects of a much smaller scale than the new space program would require. Consequently, there was a need for new research centers expressly devoted to space projects (Wallace 1999:2-3).

On August 1, 1958, Senator J. Glenn Beall of Maryland announced that NASA would establish a laboratory and plant in Greenbelt, Maryland, in the first public notice of what was to become the GSFC. On January 15, 1959, by action of the NASA Administrator, the Beltsville Space Center was created. The facility was to be located near Greenbelt in Prince George's County, Maryland, because of its proximity to Washington, D.C., and other research laboratories, including the Johns Hopkins University Applied Physics Laboratory. The focus of the facility was to be space science, which is scientific research made possible or significantly aided by rockets and spacecraft (Newell 1980:408).

In 1959, GSFC consisted of five major elements, or offices, with each office and their respective divisions assigned a code used by NASA headquarters. The five major offices at GSFC were: Tracking & Data Systems (Code 4100), Office of Technical Services (Code 4800), Office of Business Administration (Code 4900), Space Science and Satellite Application (Code 9100), and Manned Satellites (Code 9600). Within each of these offices were specific divisions. Specifically in reference to the Space Sciences and Satellite Applications Office, this office contained four divisions: Space Sciences Division (Code 9200, which would be located in Building 2), Satellite Applications System Division (Code 9300), Payload Systems Division (Code 9400), and Theoretical Division (Code 9500). The staff was largely housed at the NRL (GSFC 1960).

On April 24, 1959, construction for the new Beltsville Space Center began on a 529.1-acre tract of land acquired from the U.S. Department of Agriculture's (USDA) Beltsville Agricultural Research Center. Norair Engineering Company of Washington, D.C., was contracted to construct Buildings 1 (Space Projects Building) and 2 (Research Projects Laboratory), as well as associated access roads and parking facilities. The plans were based on designs developed by the architectural firm of Voorhees, Walker, Smith, Smith, & Haines of New York City, who envisioned and designed a "campus type" layout that they believed conducive to effective management and creative activity to accommodate the many different jobs that the center was to perform (Rosenthal 1968:53; Wallace 1999:20). The buildings were numbered in order of construction (with the exception of Building 13, which was not completed until 1979), with the general plan to put laboratories and computer facilities on the west side, utility buildings in the campus center, and offices on the east side (Wallace 1999:20).

A few weeks after construction began, the Beltsville Space Center was renamed in honor of Dr. Robert H. Goddard, a pioneer in rocket research, on May 1, 1959. By July 1960, Building 1, which would house administration as well as the Theoretical Division staff, was completed and occupied. On September 16, 1960, Building 2 was fully occupied. Buildings 3 (Central Flight Control and Range Operations Building) and 4 (Boiler Plant and Electric Substation) were occupied in 1961. By winter 1962, five additional buildings, including an instrument construction and installation laboratory (Building 5) and a payload testing facility (Building 7), were under construction, with the construction of an additional five buildings proposed for the 1963 budget (GSFC 1988: 34). Most of the buildings were one-, two-, or three-story structures that blended in with the wooded landscape (Wallace 1999:20). The six-story Building 8, which was intended to house the manned space flight program, proved the exception. Dr. Robert Gilruth, the program's head, purportedly wanted a tall structure clad in white brick (Meredith 2011; Wallace 1999:20). By 1961, however, the manned space flight program was relocated to the new space center in Houston, Texas, and Building 8 became the Administration Building (Wallace 1999:20).

From 1959 through the 1970s, the four major divisions at GSFC remained essentially the same but with further refinements (GSFC Telephone Directory var.). In particular, the Office of Space Science and Satellite Applications recognized the need for the creation of a separate division for Aeronomy and Meteorology (which would be located in Building 11). Furthermore, the Institute for Space Studies in New York City was established first as a separate element of the Theoretical Division but was transferred directly under the Division's Assistant Director by 1962 (Rosenthal 1962:34-39).

As new buildings were completed, personnel moved from the temporary warehouses at the NRL and U.S. Naval Station in Anacostia, Maryland, to GSFC. In addition, new civil servants were hired and contractors were brought on as needed (Rosenthal 1968:49-52; Daniels 2011). By the end of 1959, the space center employed approximately 579 personnel, a number which grew to over 2,850 personnel employed or committed for employment by December 1962 (Rosenthal 1962:41).

GSFC historian Alfred Rosenthal noted in 1962 "While it appears that the direct relation between some particular element or effort of Goddard and the acquisition of space knowledge may sometimes appear tenuous, the fact remains that the primary reason for the Center's [GSFC] existence was, and is, to acquire knowledge" (Rosenthal 1962:27). To carry out these tasks, GSFC staff included some of the most experienced personnel engaged in scientific research of both aeronautics and space. GSFC was specifically tasked with providing five interrelated functions for NASA. These included project management, research, development and fabrication, advanced planning, and operations of spacecraft equipment. The groups at the division level had capabilities in the following areas: space sciences, vehicle systems, theoretical research and support, instrumentation support, payload systems, and data handling and techniques (Rosenthal 1962:18).

The 1960s were also an era of unprecedented funding for space scientists; the race to get an American into space and on the moon was seen as a matter of national security, prestige, and pride (J. Townsend 2011). Following President Kennedy's man-on-the-moon challenge of 1961, funding for advanced research and technology at GSFC went from less than $1 million in 1961 to $2.78 million in 1962 (Rosenthal 1962:39).

With fiscal support readily available, by 1965, additional buildings to support the mission of the GSFC were complete, including: Building 10 (Environmental Testing Lab), Building 11 (Applied Sciences Lab), Building 12 (Tracking & Telemetry Lab), Spacecraft Operations Facility, Development Operations Building, Multi-Purpose Buildings (17-20), and support facilities, such as the gate house, pump house, and water tower. The following structures were under construction in 1965: Building 21 (the Meteorological Systems Development Lab), Building 23 (Data Interpretation Lab), Building 15 (Launch Phase Simulator Facility) and an addition to Building 24 (Central Refrigeration and Heating Plant) (GSFC 1965). By 1967, three additional buildings were completed, including Building 22 (Space and Terrestrial Applications Facility), Building 25/25A (NTTE and Hydromechanical Laboratory), and Building 26 (NASA Space Science Center) (GSFC 1988:2-10, 2-11; GSFC 1965).

Between 1959 and 1969, GSFC played a role in the launching of more than 100 spacecraft carrying a variety of experiments, many as part of the Explorer series. While the first experiments were focused on taking *in situ* measurements of particles and field in the immediate vicinity of Earth, the research was quickly expanded to include astronomy, weather, and communications satellites. As the funding increased through the 1960s, the size of the experiments undertaken by GSFC also increased. By the mid-1960s, an observatory class of experiments of significant size and weight carrying multiple instrumentation developed at GSFC emerged under the acronyms of OSO, HEAO, and OGO (Wallace 1999:27-31).

With the ending of the Apollo program in 1972, there was a lessening of public support and funding, and the mission and funding of NASA became less clear. Due to GSFC's focus on scientific missions and its diversity of programs, it was somewhat protected by the cutbacks in funding that occurred following Apollo (Wallace 1999:34; Ness 2011). Developments that occurred at Goddard in the 1970s and 1980s included refinement of the earlier observatories (OSO, OGO, and OAO) as well as the HEAO, which were dedicated to the observations of X-rays (HEAO 1 and 2) and gamma and cosmic rays (HEAO 3). COBE was also developed at GSFC during the 1970s and later launched in November 1989. This GSFC project detected the primordial seeds of galaxies and clusters of galaxies, and essentially provided evidence of the big bang theory (NASA NSSDC Master Catalog website; Dick 2007).

In the 1980s, the number of directorates at the GSFC grew from the original four to eight, the number that remains to the present day. The directorates include: the Office of the Director (Code 100), Management Operations (Code 200), Office of Flight Assurance (Code 300), Flight Projects (Code 400), Mission Operations and Data Systems (Code 500), Space and Earth Sciences (Code 600), Engineering (Code 700), and Suborbital Projects and Operations (Code 800) (GSFC Telephone Directory var.).

Throughout the late 1990s and into the early 2000s, earth science, physics, and astronomy were the primary areas of responsibility and leadership for GSFC. The center continued to serve as one of the two primary centers for the Space Sciences Directorate (also referred to as the Space Science Enterprise [SSE]). The unmanned earth observation missions and observatories in Earth orbit were and continue to be largely managed by GSFC, while unmanned planetary missions were and continue to be largely managed by the JPL in Pasadena, California (NASA 2002:3-5).

Evolution of Building 2 at the Goddard Space Flight Center

During its period of active operations (1960-2010), Building 2 was considered a science center for GSFC (Ness 2011; McDonald 2011; Bauer 2011). Building 2 was fully occupied on September 6, 1960. The International-style building was constructed based on designs by Voorhees, Walker, Smith, Smith, & Haines, whose plans refer to the building as the "Space Science Center" (GSFC Drawings var.). Also known as the "Research Projects Laboratory," the building originally housed engineers, project managers, technicians, and scientists until new buildings were completed at GSFC (Rosenthal 1962:31; GSFC 1988: 2-10, 2-11). The scientific activities carried out in Building 2 included theoretical development, research, and construction of satellite instrumentation meant to advance space science research (Looney 2011; Brandt 2011).

As constructed, each of the three floors of Building 2 had essentially the same layout, with a long, narrow, central corridor that divided laboratory spaces to the north and offices to the south. The laboratories consisted of 9-inch square asbestos tile floors starkly accentuated with a metal or rubber baseboard; moveable partition walls of composite board; and concrete or gypsum wallboard ceilings with attached acoustic-tile panels and hanging metal egg-crate style lighting. The lab spaces also included metal shelves and cabinets along the walls, benches anchored to the floors, sinks, ventilation hoods, and chalkboards (GSFC Drawings var.). The doors consisted of steel types featuring one frosted light and vents beneath. The laboratories were accessed by double-leaf metal doors comprised of a full-size pedestrian door paired with a narrower single-leaf door to accommodate larger equipment in and out of the room. The office doors consisted of single-leaf pedestrian types. The office spaces were utilitarian in nature, with asbestos-tile or carpeted flooring, plaster walls, and gypsum wallboard ceilings with inset lighting. The main vestibule and lobby, located on the east side of the building, featured terrazzo flooring, exposed brick walls, and a plaster ceiling (GSFC Drawings var.).

The missions developed in Building 2 were a collaborative effort of scientists, engineers, technicians, and analysts. The scientists were responsible for determining the scientific requirements of the mission and the data the experiment would collect. The spacecraft developed by the engineers was a critical part of the mission, carrying instruments that would collect data and advance scientific research. While the scientists were interested in placing as much instrumentation as possible on the spacecraft with the purpose of collecting the maximum amount of data, the engineers were focused on making sure the instruments and spacecraft operated properly. The project manager, often the engineer, was responsible for ensuring the system worked and managing staff, budgets, and the project schedule. The technicians worked in the laboratory spaces, often alongside the scientists and engineers, and were responsible for the testing and construction of the instrumentation. Scientists also compiled and analyzed the data (Wallace 1999:34; Daniels 2011).

Former staff of Building 2 have commented on how the floor plan at each level of the building promoted a collaborative environment, enabling a free exchange of ideas between the office and laboratory spaces. The office spaces on the south side of the building were occupied by the scientists who often had laboratory spaces across the hall. The laboratory spaces were also occupied by the technicians and an occasional engineer. Most of the engineers had office space in other buildings (particularly nearby Building 6) but worked collaboratively with the scientists and technicians in Building 2. The division directors and their administrative staff were located in the suites located in the ell at the southeastern corner of the building (Brandt 2011).

The building had loading docks at the south and north elevations, with a fabrication shop above the south loading dock on the first floor. The shop was used for quick turnaround modifications and manufacturing of smaller instrumentation (Daniels 2011). Clean rooms for the testing of experiments were located on all levels of the building, and several original clean rooms retain their ventilation panels. Storage spaces were provided by metal cabinets that lined the hallways and walls of the laboratories and office as well as metal cages in the north end of the penthouse and at the ground floor of the 1967 addition. Of note, the walls of the laboratory spaces were designed to be moveable in order to accommodate varied sizes of experiments (Daniels 2011).

Specialized test facilities were located at the ground level and in the penthouse of Building 2 and were added sometime in the mid to late 1960s. In an addition to the west elevation at the ground level was a 2-MEV Van de Graaff particle physics accelerator, a 150-keV accelerator, associated vacuum equipment, vacuum test chambers, and radiation monitoring electronic equipment (NASA 1974:5-3 to 5-4). The Van de Graaff accelerator was used to simulate solar wind particles or gases tripped in a planet's magnetic field. These tests were necessary in order to avoid damage to the spacecraft and instruments as a result of large fluxes in particles during flight. The accelerator was also used to develop and calibrate flight instruments that measure or analyze the solar wind. The Van de Graaf accelerator was used to test flight instrumentation for numerous NASA projects (including Voyager and Explorers 10, 11, and 45) and was also made available to groups outside of NASA, such as the U.S. Air Force and European Space Agency. The accelerator was part of the Energetic Particle branch (and its successors) until 1985, when a reorganization of staffing at GSFC necessitated a move to Building 22; the instrument continues in use at this location today (Brown 2011; Daniels 2011). Evidence of the former accelerator room on the ground floor (Rooms 075, 075A, 075B) remains in the form of approximately 12-inch thick walls designed to provide radiation protection, the massive door of the Van de Graff test chamber, and a hump in the floor above, which was created when the west addition was built around the chamber in 1986.

The soft-ray accelerator test facility in the south end of the penthouse generated different X-ray spectra. It was built to calibrate X-ray detectors for the instruments that flew on the HEAO series and was constructed by the team of Dr. Frank McDonald of the High Energy Astrophysics division. A 6-foot in diameter by 15-foot long test chamber on the east side of the roof was connected to an electron accelerator and target chamber at the west side by a 12-inch diameter vacuum tube. The electron accelerator was removed to Building 22 in 1985, where it continues to be used for the same purposes today. Evidence of the former use of this space includes: the test room, target chamber, and metal brackets that supported the vacuum tube (Brown 2011; Daniels 2011).

Due to the growth of the Space Sciences Division, the George M. Ewing Company designed and constructed the three-story, brick-clad south addition of Building 2 in 1967 of a form and materials similar to the 1960 block. The addition was built to provide additional offices, laboratories, and computer space (GSFC Drawings var.).

The building underwent relatively minor changes until 1986, when a three-story addition was appended to the west elevation of the principal block. The addition primarily housed computer rooms on the first and second floors, as well as additional laboratory space and a loading dock at the ground floor. In 1993, the high bay addition by Kvell Corcoran Architects PC was erected on the south end of the 1967 west ell addition. The high bay was used for assembly of large-sized experiments and also contained laboratory space at the east end of the second floor. In 1995, the loading dock of the high bay was added. At the same time, the original windows, as well as the exterior wall cladding surrounding the windows of the 1960 original block of Building 2, were completely replaced in an effort to make the building more energy efficient (GSFC Drawings var.).

Modifications to the building's interior since 1967 include the subdivision of some of the laboratory spaces; updates to flooring, ceilings, and lighting; the conversion of the ground-level accelerator into a computer room and offices; and upgrades to the building's mechanical system (GSFC Drawings var.; Peeler 2009). Although the interior has been altered, these changes convey the original use and intention of Building 2 as a dynamic space meant to adapt to changing technologies and continuous use by the various branches of the Space Sciences Division.

Space Science Divisions in Building 2, 1960-2010

A 1961 press release describes the role of the Space Science Division, the major tenant of Building 2:

> The Space Sciences Division, headed by Dr. Leslie H. Meredith, conducts basic research in the space sciences through the use of experiments carried in rocket sondes [sounding rockets], earth satellites, and space probes. It supports the NASA National Sounding Rocket Program and provides management and contract monitoring. (Rosenthal 1962:222)

Building 2 was at maximum capacity at the time of its occupation in the fall of 1960 and was initially supported by laboratory staff located off-site. The building largely accommodated personnel from divisions of the Space Science and Satellite Applications Office: 213 personnel from Space Sciences (including Division Director Dr. Leslie Meredith); 137 from Aeronomy and Meteorology (headed by Dr. William Stroud, who was located in Building 1); five from Spacecraft Technology; as well as four personnel from Fabrication, which was in the Office of Technical Services Division (Rosenthal 1962:35). Within the Space Sciences Division, which was renamed the Space Sciences Laboratory in 1965, there were specific branches. The Laboratory for Space Sciences (Code 610) included five branches, all of which occupied Building 2 during this time: Energetic Particles Branch (Code 611), located on the ground floor; Fields and Plasmas Branch (Code 612), located on the first floor; Astrophysics Branch (Code 613), located on the second floor; Solar Physics Branch (Code 614), which occupied space on the ground and second floors; and the Planetary Ionospheres Branch (Code 615), which occupied the first floor.

Additionally, from 1960 until 1962, the ground floor of Building 2 was occupied by staff of the Fabrication Division and staff of the Flight Data Systems Branch (within the Spacecraft Technology Division). The second floor also accommodated staff of the Flight Reference Systems Branch within the Spacecraft Technology Division, as well as staff within the Aeronomy and Meteorology Division (GSFC 1962).

As more buildings were completed at GSFC, by 1964 Building 2 became strictly a "science" building for scientists, technicians, and other staff within the Space Sciences Laboratory (note that by this time, the designation was changed from Division to Laboratory) (GSFC Telephone Directory var.). The ground floor accommodated the Energetic Particles Branch, while the first floor housed the Planet Ionospheres Branch and Fields and Plasmas Branch. The second floor was divided between Solar Physics and Astrophysics (GSFC Telephone Directory var.). The X-ray Astrophysics Laboratory (Code 662) was begun in 1965 by Elihu Boldt under the direction of Frank McDonald in Building 2, as part of the High Energy Astrophysics division (Cline 2011).

In 1966, the Astrophysics Branch (Code 613) relocated from Building 2 to the newly completed Building 21. Around this time, the branches became more specialized, as scientists worked to make more precise and accurate observations. The creation of new branches was an evolution of the Laboratory itself; as more data was collected and more information learned, the research became more specialized (Ness 2011). At this time, the branches within the Laboratory for Space Sciences (Code 610), headed by Dr. Leslie Meredith, also grew to include High Energy Astrophysics (Code 611), located on the ground floor of Building 2 and headed by Dr. Frank B. McDonald. This branch included the Cosmic Ray, Gamma Ray and Nuclear, and Energetic Particles Instrumentation sections. The Fields and Particles Branch (Code 612) was located on the second floor of Building 2 and headed by Dr. James P. Heppner. This branch included the Theory and Analysis, Magnetosphere, World Magnetic Survey, Fields and Plasmas Instrumentation, and Auroral and Trapped Radiation sections. The Solar Physics Branch (Code 614) occupied the ground floor and was headed by Dr. John C. Brandt. Sections within the branch included Solar Atmosphere, Solar Activity, Atomic Physics, Theoretical, and Experimental Systems. The Planetary Ionospheres Branch divided into two branches by this time: the Ionospheric and Radio Physics Branch (Code 615), located on the first floor and headed by Dr. Siegfried J. Bauer; and the Extraterrestrial Physics Branch (Code 616), also located on the first floor and headed by Dr. Norman F. Ness. Sections within each branch included ISIS Project, Upper Ionosphere, Thermal Plasma, Lower Ionosphere, and Radio Astronomy within Code 615; and Astrochemistry, Plasma Physics, and Magnetic Fields sections within Code 616 (GSFC Telephone Directory var.).

Around 1970, the organizational structure of the Space Sciences Laboratory was again refined. The Space Sciences Division was reorganized into a directorate, with some of the former branches upgraded to laboratories consisting of branches as sub-elements (Bauer 2011). Within the newly created Space and Earth Sciences Directorate (Code 600) were individual divisions and laboratories (formerly named branches), and within those laboratories were individual branches (formerly called sections). Specific to Building 2, at this time, the spaces were divided between the Laboratory for High Energy Astrophysics, under Dr. Frank McDonald, on the ground floor; the Laboratory for Extraterrestrial Physics (LEP), under Dr. Norman Ness, on the first floor; and the Solar Physics Laboratory, under Dr. John Brandt, on the second floor (GSFC Telephone Directory var.; GSFC 1988:I-25; McDonald 2011; Ness 2011). In the early 1970s, the Ionospheres and Radio Physics Branch moved to Building 21, followed in 1976 by the Solar Physics Laboratory (Bauer 2011; Brandt 2011). Therefore, by the mid-1970s, Building 2 was completely occupied by the Laboratory for High Energy Astrophysics and the LEP, as well as the Infrared Astrophysics Branch of the Laboratory for Astronomy and Solar Physics (Code 680), which worked closely with the LEP (GSFC Telephone Directory var.; Ness 2011). The High Energy Astrophysics Laboratory and the LEP and their subsequent derivatives would continue to occupy the building until its vacancy in 2010.

The High Energy Astrophysics Laboratory was and remains responsible for conducting a broad program of theoretical and experimental astrophysics research emphasizing the origins, sources, nature, and effects of high-energy particles and photons. The capabilities to conduct these applications include the development of theoretical investigations, design of experimental approaches and hardware to test these theories, and interpretation and evaluation of data gathered from these experiments (GSFC 1988:I-25).

The LEP conducted theoretical and *in situ* experimental investigations and remote observations associated with such phenomena as magnetic fields, electric fields, charged particles, and plasmas. The LEP's capabilities included the development of theoretical investigations and design of experimental approaches and hardware, in addition to analysis, interpretation, evaluation, and distribution of the information gathered (GSFC 1988:I-25).

In July 2004, the reorganization and realignment of NASA Headquarters to reflect new priorities and emphasis on the Lunar/Mars exploration prompted the merger of the Space Sciences Directorate (Code 600) and the Earth Sciences Directorate (Code 900) into the new Science and Exploration Directorate (SSE; Code 600). Under this reorganization, the SSE directorate included the Earth Sciences Division (Code 610), Astrophysics (Code 660), Heliophysics Science (Code 670), and Solar System Exploration (Code 690). In terms of Building 2 organizations, the LEP was segmented into the Heliophysics Science Division and the Solar System Exploration Division. The High Energy Astrophysics Laboratory became the Astrophysics Division and included the Laboratories for Astroparticle Physics (Code 661), X-ray Astrophysics (Code 662), Gravitational Astrophysics (Code 663), Observational Cosmology (Code 665), and ExoPlanets and Stellar Astrophysics (Code 667). Additional divisions within the SSE are the Earth Sciences Division (Code 610) (NASA Sciences and Exploration Directorate website).

At the time of its vacancy in 2010, Building 2 housed the Astrophysics Division on the ground floor, Solar System Exploration on the first floor, and the Heliospherics Science on the second floor.

Space Science Projects in Building 2

Based on interviews with former staff, the work that was carried out in Building 2 was the product of a team of scientists, engineers, and technicians that collaborated on the conception, design, testing, fabrication, and data analysis for space science projects. Initially, the staff in Building 2 were supported by laboratory space located off-site. By 1964, when more room became available due to the relocation of staff to other buildings within the GSFC campus, space science projects at the GSFC were largely developed by the staff in Building 2 (McDonald 2011; Ness 2011). Building 2 remained the center of space sciences at Goddard until the relocation of the Ionosphere and Radio Physics staff to Building 21 in 1970, followed by the relocation of the Solar Physics staff in 1976 (Bauer 2011; Brandt 2011).

In the early stages of the development of a project, the project scientist (responsible for the overall mission) and/or principal investigator (responsible for individual instrumentation or experiments) would establish the science that a proposed project intended to achieve and evaluate its feasibility and submit a proposal. Once the project was approved by NASA management, preparations began. Early on, some of the principal scientists served as project managers and would see the project forward. Otherwise, after approval from headquarters, the project manager (often an engineer) became more directly involved and dealt with internal requirements, such as schedule and cost. Technicians and engineers worked to construct and test the project prior to launch. Once a project was launched, the data began to be transmitted, received, and analyzed by scientists or data analysts (McDonald 2011; Rumerman 1999:363).

While some of the projects undertaken in Building 2 involved nearly all aspects of project development, such as the Interplanetary Monitoring Platform (IMP) series, external collaboration with other staff at the GSFC campus was entirely necessary for successful project outcomes. As NASA encouraged the use of experts, it was also common for the staff of Building 2 to be part of a number of government agencies, universities, and private companies contributing to a single experiment or mission (McDonald 2011; Daniels 2011).

International cooperation was a common component of the early work at GSFC and continues to the present day. While there was no exchange of funds between countries engaged in international experiments, information collected by the countries was shared freely. When international visiting scientists came to GSFC, they often worked in Building 2, which was considered the science center in the 1960s and into the 1970s (McDonald 2011). Goddard played an important role in the creation of the International Ultraviolet Explorer (IUE), an international collaborative effort between the United Kingdom, European Space Agency, and NASA's GSFC. Dr. Leslie Meredith of Building 2 was the first project manager for the GSFC, a project that took more than 11 years to plan and execute. The final design was conceived, designed and flown by GSFC. The IUE was launched in 1978 and proved to be the most used astronomical telescope put into orbit to date (Meredith personal communication 2011). Among other notable international projects advanced by GSFC, HELIOS-A (1974) and HELIOS-B (1976) were NASA-launched German spacecraft which studied the sun. Staff of Building 2 worked on the magnetometers and cosmic way detectors that flew on these missions (Ness 2011; Rosenthal 1982:589 and 681).

It is possible to identify specific projects or experiments that were associated with project scientists or principal investigators that had office and/or laboratory spaces in Building 2. While these projects were largely conceived of and developed in Building 2, staff from other buildings, including fabrication, testing, launching, and analysis facilities, were necessary to see a project to fruition. Administrators in Building 8 and theorists in Building 1 worked closely with the scientists of Building 2. Engineers from Building 6 assisted in the management, design, and construction of many of the projects. Depending on the type of scientific data to be gathered, there was also collaboration with scientists from Building 21. Test and evaluation of smaller instrumentation often occurred in Building 2. Testing of larger projects occurred in Building 7. Materials for the fabrication of projects required visits to Building 5. For magnetic experimentation, the Spacecraft Magnetic Test Facility, located off-site and under the operation of GSFC, was used. While the data might be received in another location, it was analyzed in Building 2 by those scientists that initially conceived of the specific projects (McDonald 2011; Ness 2011; Brandt 2011; Cline 2011; Butowsky 1984).

Aside from a small number of projects like Explorer 12, which was conceived, designed, and assembled in Building 2, project work by staff in Building 2 was largely limited to conception, development, analysis and some fabrication of instrumentation. The spacecraft were constructed elsewhere. As a case in point, the high-energy astrophysics and astrophysics staff housed in Building 2 developed instrumentation that flew on several significant NASA planetary missions that were not managed by GSFC. Magnetometer experiments developed and fabricated in Building 2 by the LEP division under the direction of Principal Investigator Dr. Norman Ness flew on Pioneers 6 (1965), 7 (1966), and 8 (1968), as well as Mariner 10 (1973) and Voyagers 1 and 2 (1977). Pioneers 10 (1972) and 11 (1973) included cosmic ray experiments and data collection instrumentation developed by the team of Dr. Frank McDonald of the High-Energy Physics (HEP) division (Ness 2011; McDonald 2011; NASA NSSDC Master Catalog website).

Dr. Leslie Meredith, the former Director of the Space Science Division/Laboratory, noted GSFC conceived and conducted one-third of all space science experiments flown in the U.S. during the 1960s, and many of these experiments were conceived at Building 2 (Meredith 2011). Other staff haven noted that many of the early NASA space science missions, as well as later award-winning projects, were the brain children of scientists working in the spaces of Building 2, particularly in the disciplines of high-energy physics, solar physics, and astronomy (Cline 2011; McDonald 2011; Ness 2011).

Several individuals interviewed during this study have observed that the center of space science at GSFC shifted from Building 2 to Building 21 following the removal of the Solar Physics branch in 1976 (Brandt 2011; Ness 2011). By this time, scientific research, fabrication, and data analysis at GSFC was more widely scattered (DeMinco 2011). Also during the post-1975 period, collaboration with local universities, such as University of Maryland and Catholic University, became more common, and graduate students occupied spaces in the building (McDonald 2011; Daniels 2011). The accelerators at the ground level and penthouse were removed in 1985, and the spaces were subsequently occupied by computers or data analysis instrumentation. The 1986 addition to the building was made to accommodate computers at the first floor and chemical laboratories at the ground level. The scientists of the HEP and LEP divisions that remained in the building after 1976 continued to conceive of, develop, and construct projects that would advance space science until 2010.

Some of the significant science projects associated with activities conducted in Building 2 are identified below.

The Explorer series of missions were characterized by relatively moderate costs and were small enough in size to be built, tested, and launched in a short time frame as compared to large observatories. While the first five Explorers in the series were launched before GSFC was formed, the staff of GSFC began work on the Explorer series in 1960 and can be credited for making this series of 75 missions successful. Explorers made important discoveries about nearly all of the space science disciplines. Contractors and universities provided some experiments, other components, and spacecraft for the Explorer series, but the series was largely developed and managed by GSFC (NASA Explorer website; Meredith 2011; NASA NSSDC Master Catalog website; Rosenthal and Corliss 1970; GSFC Telephone Directory var.). A list of the experiments developed and/or fabricated in Building 2 for the 1960s Explorer missions, as well as the Principal Investigators (PI) responsible, are provided below. In many cases, these individuals were also the Project Scientists (PS) who conceived of and advanced the idea for the experiments, as noted.

Explorer No.	Experiment Name	PI/PS
10	Rubidium vapor and flux-gate magnetometers	J.P. Heppner, PS
12	Geiger and scintillation counters	F.B. McDonald, PS
	Ion-electron detector-I	L. Davis
13	Cadium sulphide cell detector	M.W. Alexander
	Wire grid detector	L. Secretan
14	Radiation detectors	F.B. McDonald, PS
15	Electron energy distribution	U. Desai
17	Two mass spectrometers	C. Reber
18	Ion and electron probes	R. Bourdeau
	Fluxgate magnetometers	N.F. Ness
	Scintillator and Geiger telescopes	F. McDonald, PS
	Rubidium-vapor magnetometer	N.F. Ness
21	Same as Explorer 18	Same as Explorer 18
24	Same as Explorer 15	Same as Explorer 15
32	Neutral magnetometer spectrometer	C. Reber
33	Fluxgate magnetometer	N.F. Ness
	Thermal ion probe	G.P. Serbu
34	Solar proton detectors	F.B. McDonald, PS
	Cosmic-ray telescope	F.B. McDonald
	Low-energy proton and alpha detector	D.E. Hagger
	Fluxgate and rubidium-vapor magnetometers	N.F. Ness
35	Magnetometer	N.F. Ness, PS
	Thermal ion detector	G.P. Serbu
41	Three-axis fluxgate magnetometer	N.F. Ness
	Cosmic-ray telescope (2)	F.B. McDonald, PS

Explorer 18, the IMP-A, was launched in November 1963 and became the first in the series of ten IMP spacecraft. The IMP was based on the conceptions, designs, and development of Building 2 scientists: Dr. Frank McDonald served as the PS, and Dr. Norman Ness was the PI for magnetometers that flew on the series (GSFC 1962:1; McDonald 2011; Meredith 2011; Ness 2011; NASA NSSDC Master Catalog website). The purpose of the IMP satellite was to study the interplanetary magnetic fields, solar winds, and cosmic rays in order to understand the environment between the Earth and the moon. Information gained by the IMP, as well as its successors, was utilized in the design of protective shielding for manned spacecraft. Therefore, the development of the IMP was imperative for NASA's successful manned lunar program (Meredith 2011).

The Small Astronomy Satellite (SAS)-2 or SAS-B was launched in 1972 as part of Explorer 48 and carried a telescope and detected numerous gamma ray sources. The instrumentation was prepared and fabricated in Building 2 under the direction of Dr. Carl E. Fichtel, PS and was a critical first step in the development of gamma ray science (Thompson 2011). This was one of a "series of successful space telescopes in the 1960s and '70s [that] motivated the construction of NASA's four Great Observatories: the Hubble Space Telescope, the Compton Gamma Ray Observatory, the Chandra X-ray Observatory and the Spitzer Space Telescope" (Naeye 2007). The SAS-2 project was managed by engineer Marjorie Townsend, one of the earliest female project managers at GSFC. Although her office was not located in Building 2, she worked closely here with Dr. Fichtel (McDonald 2011; M. Townsend 2011; NASA NSSDC Master Catalog website).

IMP 8 (Explorer 50), the last satellite of the IMP series, was launched in 1973. Observations from IMP 8 provided insight into plasma physics, the Earth's magnetic field, the structure of the solar wind, and the nature of cosmic rays. The LEP division scientists were responsible for the development and tracking of the on-board magnetic field experiments, which were a principal source of interplanetary magnetic field data from 1963 until the satellite's removal from orbit in 2006 (an orbit of 33 years). A number of later successful gamma ray telescopes were developed, designed, and/or fabricated in Building 2, largely building on the initial gamma ray work by SAS-2. This includes the Energetic Gamma Ray Experiment Telescope (EGRET), which flew on the Compton Gamma Ray Observatory, launched in 1991 and the Fermi Gamma-Ray Space Telescope flying on the SWIFT satellite (2004) (GSFC 1993; NASA IMP-8 website; McDonald 2011; Thompson 2011).

The OSO was a series of eight orbiting observatories that NASA launched between 1962 and 1971. Seven of them were successful and provided scientists with their first extended look at the sun in the high-temperature ultraviolet, X-ray, and gamma-ray portions of the electronic magnetic spectrums—wavelengths that are not visible on Earth. The OSO spacecraft photographed the million-degree solar corona, made X-ray observations of a solar flare, and enhanced our understanding of the sun's atmosphere (Dick 2007).

OSO 1 was launched on March 7, 1962, and was the first spacecraft to acquire data on solar flares. Dr. John Lindsay of Building 2 was the OSO 1 project manager. Five instruments designed by the solar physics and astrophysics laboratories/branches of Building 2 flew on OSO 1. Gamma-ray scintillators, ultraviolet spectrophotometers, and solar spectrometers for other phases in the OSO series were developed by Building 2 scientists (Goddard Library Projects Directory website; NASA NSSDC Master Catalog website; Rosenthal and Corliss 1970; GSFC Telephone Directory var.; McDonald 2011).

The OGO platform, first launched in 1964, included a series of six observation satellites whose purpose was to conduct diversified geophysical experiments to obtain a better understanding of the earth as a planet. The satellite reflected the effort of GSFC engineers to develop a standardized observatory-type, modular spacecraft that would be cost-effective and easy to upgrade. The 20 experiments that flew on the first OGO were contributed by GSFC as well as government laboratories and universities. The PS was George Ludwig of Building 2. Experiments for OGO 1 that were carried out by staff from Building 2 are listed in the table below (NASA NSSDC Master Catalog website; Rosenthal and Corliss 1970:85; GSFC Telephone Directory var.).

Experiment	Principal Investigator
Triaxial search-coil magnetometers	E.J. Smith
Rubidium-vapor magnetometers	J.P. Heppner
Planar ion and electron trip	E.C. Whipple
Atmospheric mass spectrometer	H.A. Taylor, Jr.
Gegenschein photometer	C.L. Wolff
Positron detector	T.L. Cline
Cosmic-ray isotopic abundance detector	F.B. McDonald

Building 2 staff were also involved with the instrumentation, development, and testing for OGOs 3, 4, 5, and 6 (Rosenthal and Corliss 1970:133, 170, 184, and 227).

The Infrared Interferometer Spectrometer (IRIS), developed by principal investigator Dr. Rudolph Hanel (initially an occupant of Building 21 and later Building 2), flew on several early missions, including Nimbus 2 and Nimbus 3 (1968) and Mariner 9 (1971) (Pearl 2011; NASA NSSDC Master Catalog website). Based on the success of Nimbus, Mariner 9, and others, the proposal of an IRIS experiment for Voyager was accepted. The IRIS developed for the Voyager missions (1977) was designed by staff in Building 2, after the Infrared Group became part of the LEP in the mid-1970s. The Voyager missions proved highly successful, resulting in data collection on the conditions of Jupiter, Saturn, Uranus, and Neptune A large amount of what man understands about the structure and composition of planetary and cometary atmospheres has come from infrared spectrometers developed in Building 2 (NASA Voyager website; Pearl 2011).

The COBE was launched in November 1989 as the first satellite to observe cosmic background radiation from the early universe and confirm the big bang theory. The mission was the brain child of Dr. Michael Houser, Jr., director of the Infrared Group in Building 2. Houser, principal investigator for the Diffuse Infrared Background Experiment (DIRBE) that flew on COBE, hired John Mather to be part of the COBE team. Dr. Mather came to GSFC in 1976 to begin the study for and the development of the far-IR Absolute Spectrophotometer (FIRAS), one of three instruments that flew on COBE. Both the DIRBE and the FIRAS contributed scientific data that resulted in confirmation of the big bang theory, and Mather would eventually receive the Noble Prize for his work. The COBE mission was conceived and the DIRBE and FIRAS instrumentation initially developed in Building 2 (Mather and Boslough 1998:149; Pearl 2011; GSFC Telephone Directory var.; NASA COBE website; NASA NSSDC Master Catalog website; McDonald 2011).

Astrophysicist Dr. Mario Acuna, who came to GSFC in 1969, occupied an office and laboratory space located on either side of the first floor of Building 2 (Pearl 2011). Dr. Acuna's research interests centered on experimental investigations of the magnetic fields and plasmas in the solar system. Dr. Acuna and his team developed magnetometers that became the standard in the industry. Examples of missions on which these magnetometers flew include Voyagers 1 and 2, Pioneer 11, UOSTAT, Mars Observer, Mars Global Surveyor, Wind, Ulysses, and Cassini (GSFC 1993). Of note, the magnetometer on the Mars Global Surveyor (1996) led to the discovery that Mars once had a gravitational field similar to that of the Earth (McDonald 2011; Pearl 2011; NASA NSDDC Master Catalog website).

Evaluation

Building 2 is eligible for the National Register of Historic Places (National Register) under Criterion A in the area of science as part of a historic district associated with the GSFC, with the greatest number of projects conceived and developed in Building 2 in the 1960s and 1970s. The building represents the important achievements of a body of scientists and technicians that occupied the office and laboratory spaces. As the building did not operate independently but was largely supported by other facilities located at the GSFC, it is also recommended eligible as part of a historic district under Criterion C.

At its outset in 1959, the GSFC was to be the primary center for the Space Sciences Division of NASA, which focused on unmanned near-Earth orbit missions. The Space Sciences Division at the GSFC was initially located in off-site buildings until the completion of Building 2 in 1960. Building 2, called the Space Sciences Center or the Research Projects Laboratory, served as the main on-site building for space science research staff until the construction of Building 21, the Meteorological Systems Development Lab, in 1966. The offices, laboratories, and other spaces of Building 2 would continue as the home of the majority of the space sciences at GSFC until the relocation of the Solar Physics Laboratory to Building 21 in 1976. Thus, it can be said that Building 2 played a critical role in space sciences during the first 16 years of the GSFC when it was the primary center for NASA's near-Earth space science missions. Building 2 was essential to early space science operations at the GSFC, including mission conception, research and development, testing, and analysis.

Among the many notable missions and instrumentation that are associated with the scientists, engineers and technicians working in Building 2 are: the Orbiting Solar Observatory (OSO) (first launched in 1962); Interplanetary Monitoring Platform (IMP) (first launched in 1963); Orbiting Geophysical Observatory (OGO) (first launched in 1964); Small Astronomy Satellite (SAS)-2 (1972); and IMP-8 (Explorer 50) (1973). The instrumentation that flew on these missions led to the collection of significant scientific information in the fields of magnetic fields, solar winds, cosmic rays, x-rays, gamma rays, solar physics, and plasma physics. Instrumentation developed by Building 2 scientists also played a role in several notable planetary missions, largely headed by NASA's Johnson Space Flight Center and Marshall Space Fight Center, including Pioneer 6 (1965), 7 (1966), 8 (1968), 10 (1972), and 11 (1973), Mariner 10 (1973), and Voyagers 1 and 2 (1977). These projects are the legacy of a number of notable scientists that worked in Building 2 and made lasting achievements in the space sciences, including Dr. Mario Acuna, Dr. Rudolph Hanel, Dr. Frank McDonald, and Dr. Norman Ness.

The conceptual and developmental work that was carried out by project scientists and principal investigators in Building 2 was critical to the success of these and other space science missions. While these projects were all conceived or developed by scientists who worked in Building 2, they were also advanced through collaboration with other staff of the GSFC. Thus, Building 2 is eligible for the National Register under Criterion A in the area of science and exploration as part of a historic district associated with the GSFC. The building is significant for its role in space science research and development at the GSFC. The building represents the important achievements of a body of scientists that occupied the office and laboratory spaces. The 1960s and 1970s are the period in time in which the greatest number of significant missions and instrumentation associated with activities in Building 2 were identified.

With regards to integrity, the building evolved over time in order to enable it to continue to contribute to scientific achievements (ACHP 1991:33) and it retains sufficient integrity to communicate its relevant significance to the space science community at the GSFC. The alterations to the exterior (replacement of the original windows and window walls, the 1986 west ell, and the 1993 high bay) detract from integrity of design and materials. The 1960 and 1967 blocks retain their form and rows of window openings at the side elevations, enabling the building to convey its utilitarian purpose.

While the integrity of the building has been somewhat compromised at the exterior, there are enough intact interior features to convey a direct link between the resource and its historic use as a multi-purpose science building. The layout of the floor plan, with a central hallway and flanking office and laboratory spaces, engendered collaboration and helped to further scientific achievements. In addition, laboratory spaces were designed for scientific use as reflected by construction details in the lab spaces (asbestos tile floors; coat niches; moveable wall system; gas, electric and compressed air hooks ups; doors to accommodate large equipment; and some limited equipment). Several of these features reflect the adaptable nature of the interior spaces which enabled the building to accommodate evolving technologies, a variety of projects, and changes in scientific research procedures. The addition made in 1967 in order to provide more laboratory, office and storage space is reflective of the growth of the Space Sciences Divisions in the 1960s, a decade of significant achievements in space exploration for GSFC. The retention of the spatial divisions and integrity of materials, design, and workmanship on the building's interior and the utilitarian appearance of the building on the exterior culminate in the building's retention of integrity of materials, design, association, and feeling as a 1960s science building.

Building 2 retains integrity of location and setting, including proximity to Building 21, the other prominent space science building during GSFC's early history, and Building 6, where many of the engineers that collaborated on projects in Building 2 had offices. Integrity of association has been somewhat affected by the discontinuation of the use of the building for scientific research; however, the building remains within the GSFC complex, enabling it to maintain a direct link with the GSFC.

The project activities that were carried out here are the legacy of a number of notable scientists that worked in Building 2 and made lasting achievements to NASA space sciences, including Dr. Mario Acuna, Dr. Rudolph Hanel, Dr. Frank McDonald, and Dr. Norman Ness. However, the purpose of this investigation was not to evaluate the productive lives of these individuals in sufficient detail to confirm that Building 2 is the resource that best illustrates their contributions to space science within their individual fields of study. Therefore, no recommendations related to Criterion B (association with important individuals) are made in this document.

Building 2 is eligible under Criterion C (represents a significant and distinguishable entity whose components may lack individual distinction) as part of a concentration of buildings associated with GSFC that are united by historical development and aesthetics. Based on the documentary record, the building was one of a number of facilities that were involved in a unified mission of advancing space sciences at the GSFC. Building 2 retains integrity of location and setting, including proximity to Building 21, the other prominent space science building constructed during GSFC's early history. It also retains close proximity to Building 6, the structure that housed engineers that served as project managers for many of the projects conceived in Building 2. In addition, the brick wall cladding and metal architectural detailing at the entrance are features found on contemporary GSFC buildings from the 1960s and 1970s era which help to unify Building 2 with its surroundings.

Building 2 is not eligible under Criterion C in the area of architecture. While a number of prominent engineering and architectural firms designed elements of the building, this is not considered a notable example of their work (Peeler 2009). Nor does the building reflect a unified design or style, as the additions made in 1986 and 1993 altered the character of the south and west elevations of the building. The building is not a notable example of the International style of architecture; while it retains a cantilevered entrance at the east elevation and its overall linear form at the east and south elevations, the original window panels have been replaced with textured panels that are visibly different from the 1960 design, detracting from integrity of materials and design.

Building 2 was not evaluated for eligibility under Criterion D as part of the architectural survey and evaluation.

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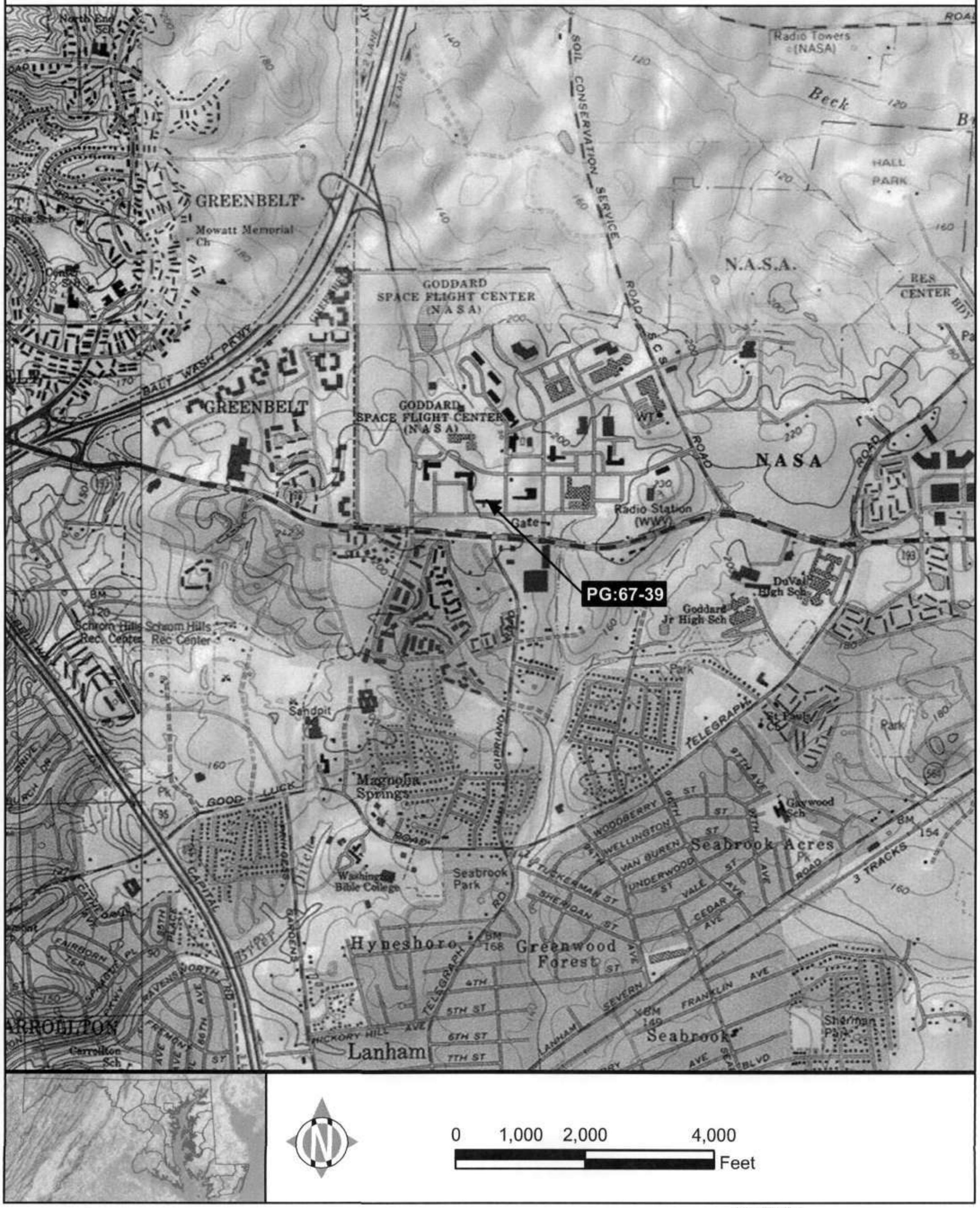
Building 2 (PG:67-39)

NASA Goddard Space Flight Center
8800 Greenbelt Road
Greenbelt, Prince George's County, Maryland



Map Source:
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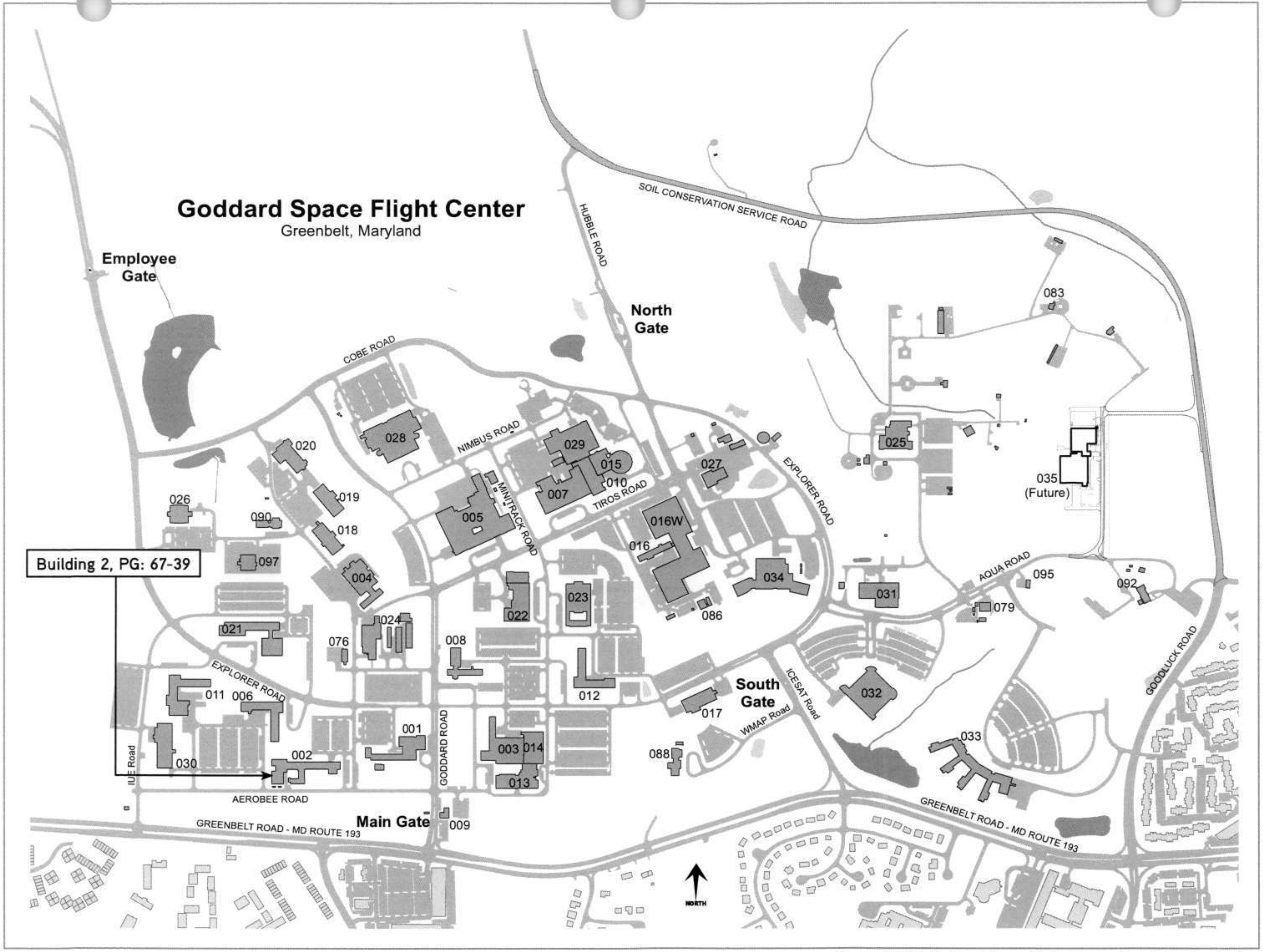

Source: NASA Goddard Space Flight Center, Greenbelt, Maryland.

B[illegible]ing 2 (Goddard Space Flight Center) (PG: 67-39)
Di[illegible]al Photo Log: All photographs printed using Epson Ultrachrom[illegible] Pigmented Ink on Epson Premium Matte Photo Paper

Photo File Name	MIHP #	Property Name	County	Photographer	Date of Photo	Photo Description	Photo Sequence
PG 67-039_201103_01	PG: 67-39	Building 2 (Goddard Space Flight Center)	Prince George's	B. Frederick	03/2011	North and east elevations, view looking southwest	1 of 17
PG 67-039_201103_02	"	"	"	"	"	South and east elevations, view looking northwest	2 of 17
PG 67-039_201103_03	"	"	"	"	"	South elevation—1967 ell and 1993 high bay addition, view looking northwest	3 of 17
PG 67-039_201103_04	"	"	"	"	"	South and west elevations of 1993 high bay addition, view looking northeast	4 of 17
PG 67-039_201103_05	"	"	"	"	"	West elevation of 1986 addition, view looking east	5 of 17
PG 67-039_201103_06	"	"	"	"	"	North and east elevations, view looking southwest	6 of 17
PG 67-039_201103_07	"	"	"	"	"	Ground floor, view looking southeast towards primary entry vestibule (to right)	7 of 17
PG 67-039_201103_08	"	"	"	"	"	Ground floor, replacement door into former Astrophysics Division suite, view looking south	8 of 17
PG 67-039_201103_09	"	"	"	"	"	Ground floor (Room 019), typical office space, view looking	9 of 17
PG 67-039_201103_10	"	"	"	"	"	Ground floor, shower in janitor's closet, view looking northeast	10 of 17
PG 67-039_201103_11	"	"	"	"	"	Ground floor, entry into former accelerator room (note ramp and thick walls), view looking west	11 of 17
PG 67-039_201103_12	"	"	"	"	"	Stairwell in original 1960 block, view looking south	12 of 17
PG 67-039_201103_13	"	"	"	"	"	First floor, corridor, view looking east	13 of 17
PG: 67-039_201103_14	"	"	"	"	"	First floor, Room 110, laboratory space, view looking southeast	14 of 17
PG 67-039_201103_15	"	"	"	"	"	First floor (Room 162), laboratory space, view looking southeast	15 of 17
PG 67-039_201103_16	"	"	"	"	"	First floor (Room 170), laboratory space, view looking northeast	16 of 17
PG 67-039_201103_17	"	"	"	"	"	Second floor, Room 230/230A, laboratory/office, view looking northwest	17 of 17


2

PG: 67-39

BUILDING 2 (GODDARD Space Flight Center)

PRINCE GEORGE'S COUNTY, MARYLAND

B. FREDERICK

03.2011

MD SHPO

NORTH & EAST ELEVATIONS, VIEW LOOKING SOUTHWEST

PHOTO # 1 of 17


2

PG: 67-39

BUILDING 2 (GODDARD Space Flight Center)

PRINCE GEORGE'S county, MARYLAND

B. FREDERICK

03. 2011

MD SHPO

SOUTH & EAST ELEVATIONS, VIEW LOOKING NORTHWEST

PHOTO # 2 of 17

PG:67-39

BUILDING 2 (GODDARD SPACE FLIGHT CENTER)

PRINCE GEORGE'S COUNTY, MARYLAND

B. FREDERICK

03.2011

MDSHPO

SOUTH ELEVATION - 1967 ELL & 1993 HIGH BAY ADDITION, VIEW LOOKING NORTHWEST

PHOTO # 3 of 17


LONG FENCE

PG:67-39

BUILDING 2 (GODDARD SPACE FLIGHT CENTER)

PRINCE GEORGE'S COUNTY, MARYLAND

B. FREDERICK

03.2011

MD SHPO

SOUTH & WEST ELEVATIONS OF 1993 HIGH BAY ADDITION, VIEW LOOKING NORTHEAST

PHOTO # 4 of 17

PG:67-39

BUILDING 2 (GODDARD SPACE Flight center)

PRINCE GEORGE'S COUNTY, MARYLAND

B. FREDERICK

03.2011

MD SHPO

WEST ELEVATION OF 1986 ADDITION, VIEW LOOKING EAST

PHOTO # 5 of 17

PG:67-39

BUILDING 2 (GODDARD SPACE Flight center)

PRINCE GEORGE'S COUNTY, MARYLAND

B. FREDERICK

03.2011

MD SHPO

NORTH & EAST ELEVATIONS, VIEW LOOKING SOUTHWEST

PHOTO # 6 of 17


JANITORS CLOSET

PG:67-39

BUILDING 2 (GODDARD Space Flight center)

Prince George's county, MARYLAND

B. FREDERICK

03.2011

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GROUND FLOOR, VIEW LOOKING SOUTHEAST TOWARDS PRIMARY ENTRY VESTIBULE (TO RIGHT)

Photo # 7 of 17


011
SCIENCE
DIVISION
CODE 660

PG: 67-39

BUILDING 2 (GODDARD Space Flight Center)

Prince George's County, MARYLAND

B. Frederick

03. 2011

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GROUND FLOOR, REPLACEMENT DOOR INTO FORMER ASTROPHYSICS DIVISION SUITE, VIEW LOOKING SOUTH

PHOTO # 8 of 17

PG:67-39

BUILDING 2 (GODDARD SPACE Flight center)

PRINCE GEORGE'S COUNTY, MARYLAND

B. FREDERICK

03.2011

MD SHPO

GROUND FLOOR (ROOM 019); TYPICAL OFFICE SPACE,

VIEW LOOKING SOUTH

Photo # 9 of 17

PG: 67-39

BUILDING 2 (GODDARD Space Flight center)

Prince George's county, MARYLAND

B. FREDERICK

03.2011

MD SHPO

GROUND FLOOR, SHOWER IN JANITOR'S CLOSET, VIEW LOOKING NORTHEAST

Photo # 10 of 17


75
075
075

PG: 67-39

BUILDING Z (GODDARD Space Flight Center)

Prince George's County, MARYLAND

B. FREDERICK

03, 2011

MDSHPO

GROUND FLOOR, ENTRY INTO FORMER ACCELERATOR ROOM (NOTE RAMP; THICK WALLS), VIEW LOOKING WEST

Photo # 11 of 17

PG: 67-39

BUILDING 2 (GODDARD Space Flight center)

Prince George's County, MARYLAND

B. Frederick

03.2011

MD SHPO

STAIRWELL IN ORIGINAL 1960 BLOCK, VIEW LOOKING SOUTH

Photo # 12 of 17

PG: 67-39

BUILDING 2 (GODDARD SPACE Flight center)

Prince George's county, MARYLAND

B. FREDERICK

03. 2011

MD SHPO

1st FLOOR, CORRIDOR, VIEW LOOKING EAST

Photo # 13 of 17

PG: 67-39

BUILDING 2 (GODDARD Space Flight Center)

PRINCE GEORGE'S COUNTY, MARYLAND

B. FREDERICK

03. 2011

MD SHPO

FIRST FLOOR, ROOM 110, LABORATORY SPACE, VIEW LOOKING SOUTHEAST

Photo # 14 of 17

PG:67-39

BUILDING 2 (GODDARD Space Flight Center)

PRINCE GEORGE'S COUNTY, MARYLAND

B. Frederick

03. 2011

MDSHPO

1st FLOOR (ROOM 162), LABORATORY SPACE, VIEW LOOKING SOUTHEAST

Photo # 15 of 17

PG: 67-39

BUILDING 2 (GODDARD Space Flight center)

Prince George's County, MARYLAND

B. FREDERICK

03.2011

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FIRST FLOOR (ROOM 170), LABORATORY SPACE, VIEW LOOKING NORTHEAST

Photo # 16 of 17

PG:67-39

BUILDING 2 (GODDARD Space Flight Center)

PRINCE GEORGE'S County, MARYLAND

B. FREDERICK

03.2011

MD SHPO

SECOND FLOOR, ROOM 230/230A, LABORATORY/OFFICE, VIEW LOOKING NORTHWEST

Photo # 17 of 17

MARYLAND HISTORICAL TRUST
DETERMINATION OF ELIGIBILITY FORM

NR Eligible: yes ___ no ___

Property Name: NASA Goddard Space Flight Center - Building 2 Inventory Number: PG:67-39

Address: 8800 Greenbelt Road City: Greenbelt Zip Code: 20771

County: Prince George's USGS Topographic Map: Lanham

Owner: National Aeronautics and Space Administration Is the property being evaluated a district? ___ yes

Tax Parcel Number: N/A Tax Map Number: N/A Tax Account ID Number: N/A

Project: ___ Agency: ___

Site visit by MHT Staff: X no ___ yes Name: ___ Date: ___

Is the property located within a historic district? ___ yes X no

If the property is within a district District Inventory Number: ___

NR-listed district ___ yes Eligible district ___ yes District Name: ___

Preparer's Recommendation: Contributing resource ___ yes ___ no Non-contributing but eligible in another context ___

If the property is not within a district (or the property is a district)

Preparer's Recommendation: Eligible ___ yes X no

Criteria: ___A ___B ___C ___D Considerations: ___A ___B ___C ___D ___E ___F ___G ___None

Documentation on the property/district is presented in:

Description of Property and Eligibility Determination: *(Use continuation sheet if necessary and attach map and photo)*

Summary Description

Building 2 is located on the 1,270-acre campus of the Goddard Space Flight Center (Goddard Space Flight Center [GSFC] "Goddard Facilities and Installations" n.d.). The buildings on the campus are modestly landscaped buildings to include some ornamental trees and foundation plantings. Additional landscape features at the Center include wooded areas, gently rolling hills, and a small pond. Goddard Space Flight Center designed and tested non-manned objects launched into space when the research and testing facility was constructed; this mission continues to the present.

Building Description

Building 2 generally occupies a rectangular footprint and faces north. The three-story building rests on a poured-concrete foundation and terminates in a flat roof; roofing materials are not visible. Mechanical equipment appears to be housed in various rooftop additions. The primary building material is brick; other building materials include metal panels installed vertically to separate the bays and textured masonry that appears to be similar to exterior insulation finishing system (EIFS) (i.e., Dryvit) located above and below the windows to horizontally divide the

MARYLAND HISTORICAL TRUST REVIEW

Eligibility recommended X **Eligibility not recommended** ___

Criteria: X **A** ___**B** ___**C** ___**D** **Considerations:** ___**A** ___**B** ___**C** ___**D** ___**E** ___**F** X **G** ___**None**

Comments: Exceptionally significant for association with space exploration

Jonathan Sager 4/28/10

Reviewer, Office of Preservation Services **Date**

[signature] 2/3/10

Reviewer, NR Program **Date**

bays. The existing metal panels and EIFS were installed in 1995 when an exterior renovation of the building was undertaken. Windows generally are fixed-light, anodized-aluminum sash. One ell, contemporary to original building construction, was constructed on the south elevation. Three additions, including a high bay, were constructed in 1967, 1986, and 1993 on the south and west elevations. The description begins with a discussion of the principal block; discussions of the wing and all additions follow and continue in a counter-clockwise manner, beginning with the west elevation. Attached photos generally follow the same order as the building descriptions; a keyed plan also is provided.

The four-bay east elevation of the principal block, which was completed in 1960, features the primary entrance and a ground-floor window wall. The upper floors, which are blind, are completed in brick. Square metal posts divide the first floor bays. Each ground-floor window bay has four, fixed, single-light, aluminum-sash windows with transoms. The recessed entrance is located in the southernmost bay and contains a double-leaf metal door with flanking, single-light metal windows. Fixed, single-light, anodized-aluminum sash define the two-bay south elevation. Metal and EIFS panels divide the bays. A one-bay by four-bay ell (east) extends from the south elevation.

The south elevation of the principal block extends for seventeen bays before it is interrupted by the 1967 west ell addition. The south elevation of the principal block rests on a brick base and features single-light, anodized-aluminum, fixed-sash windows. Metal and EIFS panels divide the bays. The south elevation of the principal block continues for an additional seven bays beyond the west ell addition. A single-story rooftop metal addition was constructed where the principal block joins the west ell addition. A one-story addition was constructed in 1986 on the west elevation of the principal block, obscuring the original west elevation of the principal block from view. The multi-bay north elevation rests on a brick base completed in 5:1 common bond. The remaining cladding materials used throughout the elevation are metal panels. An entrance located at the west end of the north elevation features a single-leaf metal door; a small metal window flanks the entrance. The north elevation's off-center primary entrance features double-leaf metal doors. North elevation windows are multi-component units containing a single-light, anodized-aluminum, fixed-sash with a single-light sash above and below the primary window unit.

The four-bay east ell is four stories tall; the fourth story is recessed on the east elevation. The one-bay, brick east elevation of the east ell features a recessed entrance on the first floor and single-light, anodized-aluminum, fixed-sash windows at the second and third floors. The ell's four-bay south elevation consists of single-light, anodized-aluminum, fixed-sash units. A large vent, the length of the four window bays, is located on the fourth floor. Metal and EIFS panels divide the bays. The one-bay west elevation of the east ell features one single-light, fixed-sash, anodized-aluminum window on the second and third floors at the north end of the elevation. A single-leaf metal door is located on the first floor. A metal-panel rooftop addition located on the east ell extends to connect to a rooftop addition located on the east end of the principal block.

The three-story, five-bay east elevation of the west ell addition, constructed in 1967, features single-light, fixed-sash, anodized-aluminum windows. Metal and EIFS panels divide the bays. The west elevation of the west ell also is five bays and features similar masonry and metal paneling as found on the east elevation. An entrance containing a single-leaf metal and glass door is located at the north end of the elevation. Five, single-light, fixed-sash, anodized-aluminum windows are located above the entrance. A flat-roof metal rooftop addition with louvered openings is visible on the roof.

A two-story brick and metal addition containing a high bay was constructed on the south elevation of the west ell. The 1993 addition appears to have a flat roof; interior inspection of the high bay suggests the high bay terminates in a shallow gable roof. A single-leaf metal door and metal staircase is located on the east elevation of the high bay addition. The east elevation of the high bay addition projects from the east elevation of the west ell where the addition adjoins the west ell. No other openings are present on this elevation. Two bays of small, single-light, fixed-sash, anodized-aluminum windows in the second and third floors are found on the east end of the south elevation; louvered vents are located at the ground floor. The exterior of the high bay section of the building is constructed of-raised metal panels; the metal panels continue to the west elevation of the addition. The openings on the three-bay high bay are characterized by a translucent wall system consisting of four large, multi-light openings per bay; the openings are covered in an opaque material. A metal stair case leading to a single-leaf metal door is located in the west bay. The north elevation of the high bay is completed in the same manner as the south elevation; however, two bays of four-light metal ribbon windows are located in the basement level.

A 1995 addition to the high bay includes a two-story, recessed loading dock constructed on the west elevation of the high bay. The loading dock addition, which is constructed in brick, has an overhead garage door and poured-concrete loading dock on the south elevation; a single-leaf metal door and poured-concrete staircase is located on the west elevation of the garage addition. The north elevation of the garage is blind.

A one-story, 5:1 common bond brick addition was appended to the west elevation of the building's principal block. Constructed in 1986, the addition includes a loading dock constructed on the south elevation of the principal block. The south elevation of the loading dock features an overhead metal garage door; the east elevation is blind. The addition is four bays on the east elevation. The bays consist of six windows comprising single-light, anodized-aluminum, fixed-sash windows resting on a single-light unit. The central unit in each window grouping is a multi-light casement. A recessed entrance containing a double-leaf metal door is centered on the south elevation. The west elevation is four bays and features the same type and configuration of windows as found on the east elevation. The primary entrance to the west elevation is recessed and features a two-story glass and metal curtain wall. A two-story running bond brick mass extends from the north elevation of the 1986 addition. The south and west elevations of the north mass are blind. The north elevation of the north mass features four bays of seven, single-light metal windows. A row of header bricks runs between the first and second floor windows.

The building interior contains office and laboratory space. Interior stairwells feature glazed concrete-block. Interior walls are steel and were designed to be moved. Steel was used as a construction material to stop conductivity from interfering with instruments (Annen personal communication 2009).

The interior of the high bay is finished in prefabricated metal, concrete-block, and brick and terminates in a shallow gable roof. The single-cell room consists of uninterrupted open space. A loft occupies the east end of the room. An overhead metal garage door is located in the west elevation. Multi-light, opaque metal windows provide minimal light into the room's interior. The high bay has a painted cement floor. Two I-beams with tracks run parallel to the exterior walls with a metal track running perpendicular to the I-beams. The track and pulley system is used to lift heavy equipment. Ducts run along the exterior walls and up onto the ceiling. Pipes run along the concrete-block walls up across the ceiling. Metal framing with I-beams support the roofing system.

History of Goddard Space Flight Center

The National Aeronautics and Space Administration (NASA)'s Goddard Space Flight Center was established on 15 January 1959 as the Beltsville Space Center. The facility was located near Greenbelt in Prince George's County because of the proximity to Washington, D.C., and other research labs, including the Johns Hopkins University Applied Physics Laboratory. Goddard's facilities enabled payload testing without risking an actual launch (National Aeronautics and Space Administration [NASA] 1962:224).

The Goddard Space Flight Center acquired its current name on 1 May 1959 in honor of Dr. Robert H. Goddard, a pioneer in rocket research. Goddard successfully constructed and tested the first rocket to use liquid fuel. The center was established to provide project management and advanced planning and to conduct research, development, and fabrication of spacecraft equipment (NASA 1962:18). Early missions included the "theoretical, planning, research, development and operational phases of space flight, utilizing laboratory studies and experiments, sounding rockets, earth satellites and space probes" (NASA 1962:222). Goddard was supposed to function as the communication and engineering center for NASA, but former Goddard scientist Frank McDonald was instrumental in establishing Goddard as the science center for NASA (Annen personal communication 2009).

Historically, projects undertaken at Goddard were "cradle-to-grave," with all project work, design, development, testing, and data analysis completed at the facility (DeMinco personal communication 2009). Today, Goddard scientists work on projects sponsored by outside facilities and in collaboration with other research institutions. Additionally, Goddard scientists collaborate on projects developed and administered by Goddard. Scientists working in Building 2, in collaboration with other NASA scientists and scientists from other research facilities, participated in a number of important projects.

The Goddard campus originally comprised 550 acres that were acquired from the U.S. Department of Agriculture. The New York City firm of Voorhees Walker Smith Smith and Haines prepared the engineering master plan for the installation and were the architects for the building (NASA 1962:31; GSFC var.). Various iterations of the architectural firm designed prominent buildings in New York City, including, the Fordham Law School, the Fresh Meadows Housing Development, Allied Chemical Tower, and the Irving Trust Company (Willensky and White 1988). On 10 April 1959, the Washington, D.C.-based Norair Engineering Corporation was awarded the contract to construct the first two buildings at the facility: Buildings 1 and 2 (NASA 1962:31). Norair Engineering Corporation was founded in 1935 as an engineering firm specializing in central heating and air conditioning (Norair Engineering Corp. n.d.). The firm later expanded to include the engineering of buildings, treatment plants, and subway stations (Norair Engineering Corp. n.d.). Today, the majority of work undertaken by Norair Engineering Corp. includes infrastructure projects.

In addition to building construction, the contract called for the construction of access roads and parking areas (NASA 1962:31). By 16 September 1960, Building 2 was fully operational (NASA 1962:31). When it was originally constructed, Building 2 was designated the Research Projects Laboratory. By 1962, three of the eight buildings that originally were planned at Goddard had been constructed. Most of the facility's 16 buildings were completed by 1968 (NASA 1962:32; DeMinco personal communication 2009).

History of Building 2

Limited archival research is available on Building 2; the archival record is unclear as to what type of research was conducted or programs completed and implemented in the building between 1960 and 1970 (DeMinco personal communication 2009). Historically, the building served as the origin point for scientific experimentation (Annen personal communication 2009). Although Building 2 was the science hub for Goddard, the building's functions have changed to accommodate more administrative functions. Considerable scientific work also is outsourced to universities, while laboratory, fabrication, administration, and data analysis continue to be completed by scientists working in Building 2 and other buildings located at Goddard (DeMinco personal communication 2009).

Building 2 contains administrative offices, testing laboratories, clean rooms, and storage facilities. Administrative functions undertaken by Building 2 scientists include grant writing for project funding (Annen personal communication 2009). Balloons and equipment are tested in the high bay, which was constructed in 1993. The Washington, D.C.-based architectural firm Kvell Corcoran Architects, PC designed the high bay and the subsequent 1995 modifications. Founded in 1978, the firm specializes in residential, retail, and office design (KCA Architecture & Engineering, n.d.). All mirrors for X-ray lenses for all space projects are made in Building 2. Scientists working in Building 2 conduct research in the following topics: X-ray/infrared technology, solar system exploration, chemistry research, and astrophysics. Building 2 scientists have participated in many activities and projects. The following list of activities and projects is not exhaustive:

- Equipment/Instrument Testing and Design – Explorer Satellite. The Explorer series consisted of numerous satellite projects for the Interplanetary Monitoring Platform, low frequency radio wave monitoring, celestial X-ray astronomy, the study of magnetic fields, and the completion of a number of near space experiments, among many other projects. Scientists working in Building 2 tested Explorer Satellite designs.

- WIND Spacecraft and POLAR Spacecraft. The WIND Spacecraft was launched on 1 November 1994 to provide input for magnetospheric and ionospheric studies; to determine the magnetospheric output to interplanetary space; to investigate basic plasma processes; and to provide baseline ecliptic plane observations (NASA 2005). The POLAR satellite was launched under the POLAR mission on 24 February 1996 to provide multi-wavelength imaging; to measure the entry of plasma; and to identify the deposition of particle energy in the ionosphere and upper atmosphere (NASA n.d.). Goddard scientists working in Building 2 tested the instruments used in these missions.

- SWIFT Observatory and Fermi Mission – The SWIFT Observatory was launched by Goddard Space Flight Center on 1 September 2004 to study gamma-ray burst science (GSFC 2007). The Fermi mission is accomplished through the Fermi Gamma-ray Space Telescope, which measures pulsars. Scientists working in Building 2 helped build these spacecraft.

- Data Analysis Examples
  - Spitzer Space Telescope. Launched on 25 August 2003, the Spitzer is the largest infrared telescope launched into space (Spitzer Science Center n.d.). The telescope allows scientists to view "regions of space which are hidden from optical telescopes" (Spitzer Science Center n.d.). Goddard scientists analyze the data generated from the telescope.
  - Cassini Mission to Saturn. This NASA mission that is administered by the Jet Propulsion Laboratory, California Institute of Technology, collected data on Mars and its largest moon, Titan. The main mission was conducted between 2004 and 2008. Goddard scientists located in Building 2 analyzed the data generated from this Mission. Currently, some data analysis occurs in the building's former computer room.

Important researchers, including renowned scientist Mario Acuña, had laboratories located in Building 2. Acuña was educated in Argentina at the University of Cordoba, where he obtained an undergraduate degree and at the University of Tucuman where he received a master's degree in electrical engineering. His lab was recognized around the world as the "leader in the development of instrumentation for the measurement of geophysical magnetic fields as well as plasma, electromagnetic waves, gamma, and X-rays (Johns Hopkins University Applied Physics Laboratory 2008). A specialist in the "interactions of magnetic fields and plasmas and the instruments used to measure them," Acuña worked at Goddard Space Flight Center between 1969 until his death in March 2009 (Sullivan 2009:C08). Scientific instruments designed by Acuña have flown on over 30 NASA missions and have gone to every planet in the solar system (Sullivan 2009:C08). In addition to designing instruments, Acuña is credited with discovering the magnetic disturbance around Jupiter, which eventually led to the discovery of its ring (Sullivan 2006:C08).

Currently, scientists are in the process of vacating the building and moving offices and laboratories to Building 34.

Modifications to Building 2 / Drawing Review
A review of the list of drawings maintained by the GSFC architect's office suggests that the building has undergone a continuous program of alteration, modernization, and new construction since it was built in 1960. The original curtain wall included porcelain enamel metal panels and a brick veneer. Drawings of the building suggest that the building employed at least three different types of single-light windows; drawings detailing the specific window type are unavailable (GSFC var.). Few photographs of the building are available from the date of construction to provide additional information on the original windows.

The 1959 drawings suggest the building was constructed in the International Style. Popular from the late 1920s to the present, the style emphasized curtain wall construction and smooth, unadorned building materials. The use of metal windows, particularly large, single-light sash, was common. The style was popular for the design of skyscraper office towers; however, its use in residential construction was not uncommon.

In 1967, plans were developed for the construction of the south addition (west ell) to the building. George M. Ewing Co. designed the addition, which called for the construction of a three-story brick building. Design elements included single-light, fixed-sash windows with cement masonry units between all window bays. The new addition housed offices, laboratories, and computer space (GSFC var.).

The next major alteration was the construction of the addition off the principal block's west elevation. The brick-veneer addition incorporated fixed-sash windows. The Bethesda, Maryland-based firm of O'Neil & Manion designed the 1986 addition, which primarily housed computer rooms on the first and second floors in addition to limited laboratory space. A loading dock also was included in the design (GSFC var.). The firm was founded in 1977 by Sara P. O'Neil Manion and William C. Manion. Since it's founding, the firm has undertaken the design of numerous recreational and research and institutional facilities as well as residences in the Washington, D.C. region.

The high bay, constructed in 1993, was designed by Kvell Corcoran Architects PC. The brick-veneer building has a pre-engineered metal frame with metal under panels, two types of metal panels, and a translucent wall system (GSFC var.). In 1995, Kvell Corcoran Architects PC developed designs for the modification to the high bay. Modifications included the construction of a new loading dock to replace the existing (GSFC var.).

The building was modified again in 1995. At that time, the original windows and exterior cladding were replaced. The new wall system consisted of "factory fabricated extruded and welded aluminum architectural grille" (GSFC var.). This wall system currently is in place on the building. Gauthier Alvarado & Associates, Inc. was the architectural firm that designed the modifications. Located in Falls Church, Virginia, the firm specializes in the design of educational, research/laboratory, government, and commercial facilities.

Major interior modifications were made to the building in 1985, 1991, 1993, 1995 and include the modification of the tape storage facility into a computer room and offices, the subdivision of some laboratory spaces, and modifications to conference rooms and lobbies, in addition to upgrades made to the building's mechanical systems (GSFC var.).

A landscape plan also was developed for the building. Undated plans indicate that Southern magnolia, pink dogwood, Japanese pagoda trees, red maple, and willow oaks were to be planted. At least one magnolia tree remains (GSFC var.). Visual observation suggests that the pink dogwoods and willow oaks planned for the north elevation are not extant and that the planned formal landscaping for the north elevation was not implemented.

Evaluation
Building 2, which was fully operational by September 1960, is less than 50 years old and was evaluated under National Register Criteria A, B, and C, and Criteria Consideration G for exceptional importance for those properties

less than 50 years of age. Data analysis and project instrument and sub-instrument testing occurred in the building. While many of the instruments were used on important projects that have contributed to a greater understanding of space, the earth, and the solar system, a specific project's design, testing, or data analysis of a project's results from start to finish has not occurred in the building (Criterion A). Archival research and oral interviews were unable to identify specific aspects of the many Goddard Space Flight Center projects that were completed in Building 2. Rather, the specific work completed in Building 2 was the result of collaborative efforts between Goddard Space Flight Center scientists and scientists working at other Goddard facilities or outside research institutions. In most cases, the work completed by Building 2 scientists was only one component of very large projects that were divided among many scientists and research and testing facilities located both at and outside of the Goddard Space Flight Center. In addition, the public affairs office does not maintain records on the specific assignments of office and research space occupied by GSFC scientists; therefore it is difficult to link a specific scientist to a specific space in the building or to a specific project developed, designed, or tested in Building 2 (DeMinco personal communication 2009). Therefore, Building 2 does not have documented exceptional significance under Criteria Consideration G within the historic context of scientific research and testing for space exploration.

Renowned scientist Mario Acuña worked for Goddard Space Flight Center for forty years. For a property to eligible for the National Register for its association with a person important in the past (Criterion B), the property must be associated with the person's productive years and should reflect the period the person achieved significance (National Park Service 1991:15). Although he made many significant contributions to space science, research conducted to date has been unable to identify the years Acuña worked in Building 2, or which, if any, of his important contributions to the field were made while working in Building 2. Therefore, Building 2 does not have documented exceptional significance in the lives of persons important in our past.

A number of prominent architectural firms with practices in the Washington, D.C. region and New York City have designed elements of the building. The original building architects, Voorhees Walker Smith Smith and Haines, designed important buildings in New York City, including, the Fordham Law School, the Fresh Meadows Housing Development, Allied Chemical Tower, and the Irving Trust Company (Willensky and White 1988). While original drawings suggest the building was constructed in the International Style, few character-defining elements (i.e. the window openings) of the style remain on the building. The building as it stands today reflects the work of several architectural firms. As a result, the building does not reflect a unified design or style (Criterion C). Local architects designed additions and modifications to the building in 1967, 1986, and 1993. The smooth, unornamented original cladding materials were replaced with textured aluminum panels and EIFS in 1995, which altered the building's original character. Due to the degree of interior and exterior alterations, the building no longer retains integrity of design, materials, workmanship, feeling, or association to convey its original 1960 design under Criterion C. The current appearance of the building does not meet Criteria Consideration G for its design. The building does not appear to possess the integrity or significance necessary for listing in the National Register of Historic Places.

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Photo Log

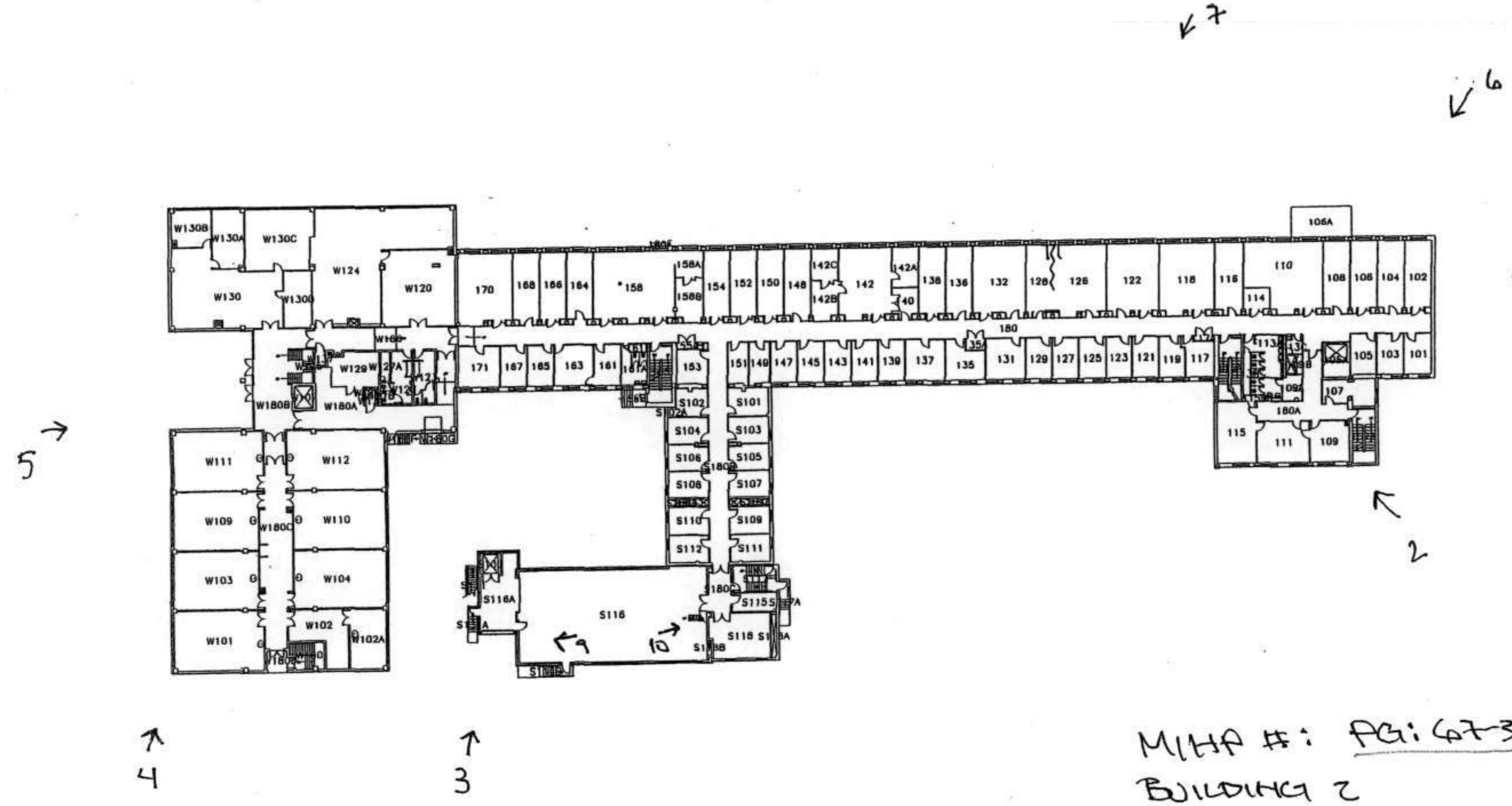
MIHP # PG:67-39
Building 2
NASA Goddard Space Flight Center
Prince George's County, Maryland
Photos taken by: Melissa Crosby
Photos taken on: September 2009
Photo paper and ink: HP Vivera ink 97 Tri-Color cartridge, 101 Blue Photo cartridge, and 102 Gray Photo cartridge on HP Premium Photo Paper (high gloss)
Verbatim Ultralife Gold Archival Grade CD-R, PhthaloCyanine Dye

1. East elevation of principal block
2. East and south elevations of principal block
3. South elevation of west ell, showing 1993 high bay and 1995 addition
4. South and west elevations of west end constructed in 1986
5. West elevation constructed in 1986
6. North and east elevations of principal block
7. North elevation of principal block
8. Interior, of corridor in principal block
9. Interior, high bay, looking west
10. Interior, high bay, looking east

Prepared by: Kirsten Peeler, Project Manager
R. Christopher Goodwin & Associates, Inc.
241 East Fourth Street
Frederick, MD 21701

Date Prepared: 24 November 2009

PG: 67-39



MIHP #: PG: 67-39

BUILDING 2

NASA GODDARD SPACE FLIGHT CENTER

GREENBELT

PRINCE GEORGE'S COUNTY

GODDARD

SPACE FLIGHT CENTER

FACILITIES MANAGEMENT DIVISION

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GRAPHIC SCALE FEET

NORTH

Display	BASE PLANS	
Project: Base Plans – As Built		Location: Building 2 Floor 1
Scale: 1/64"=1'-0"	Drawing	Data Date: 03/12/08	Graphics Date: 03/12/08

MIHP # PG: 67-39
BUILDING 2
NASA GODDARD SPACE FLIGHT CENTER
GREENBELT
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2

MIHP # PG:67-39
BUILDING 2, NASA GODDARD SPACE
FLIGHT CENTER

PRINCE GEORGE'S COUNTY, MD
MELISSA CROSBY, SEPT 2009
EAST ELEVATION, PRINCIPAL BLOCK
1 OF 10

MIHP # PG:67-39
BUILDING 2, NASA GODDARD SPACE
FLIGHT CENTER

PRINCE GEORGE'S COUNTY, MD

MELISSA CRANY, SEPT 2009
EAST & SOUTH ELEV. PRINCIPAL BLOCK

2 OF 10

MIHP # PG: 67-39
BUILDING 2, NASA GODDARD SPACE
FLIGHT CENTER

PRINCE GEORGE'S COUNTY, MD
MELISSA CROSBY, SEPT 2009
SOUTH ELEVATION OF WEST ELL
3 OF 10

MIHP # PG:67-39

BUILDING 2, NASA GODDARD SPACE FLIGHT CENTER

PRINCE GEORGE'S COUNTY, MD

MELISSA CROSBY

SEPT 2009

SOUTH & WEST ELEV OF WEST END

4 OF 10

MIHP # PG:67-39

BUILDING 2 - NASA GODDARD SPACE
FLIGHT CENTER

PRINCE GEORGE'S COUNTY

MELISSA CROSBY

SEPT 2009

WEST ELEVATION

5 OF 10


2

HAER # PG: 69-39

BUILDING 2 - NASA GODDARD SPACE FLIGHT CENTER

PRINCE GEORGE'S COUNTY, MD

MELISSA CROSBY

SEPT 2009

NORTH + SOUTH ELEVATIONS

6 OF 10

MHHR # PG: 67-39
BUILDING 2, NASA GODDARD SPACE
FLIGHT CENTER
PRINCE GEORGE'S COUNTY, MD
MELISSA CROSBY,
SEPT 2008
NORTH ELEVATION
7 OF 10


cushioning material
Office DEPOT
cushioning material

MIHP # PG: 67-39
BUILDING 2, NASA GODDARD SPACE
FLIGHT CENTER
PRINCE GEORGE'S COUNTY, MD
MELISSA CROSBY
SEPT 2009
INTERIOR, CORRIDOR OF PRINCIPAL BLOCK
8 OF 11

Office DEPOT
31400

MIHP # PG:67-34
BUILDING 7, NASA GODDARD SPACE
FLIGHT CENTER
PRINCE GEORGE'S COUNTY, MD
MELISSA CROSBY
SEPT 2009
INTERIOR, HIGH BAY, LOOKING WEST
9 OF 14

MIHP # PG:67-39

BUILDING 2, NASA GODDARD SPACE FLIGHT CENTER

PRINCE GEORGE'S COUNTY, MD

MELISSA CROSBY

SEPT 2009

INTERIOR, HIGH BAY, LOOKING EAST

10 OF 10